THE AMERICAN GAS LIGHT JOURNAL

PUBLISHING OFFICE No. 42 PINE STREET

DEVOTED TO THE INTERESTS OF ILLUMINATION, HEATING, MECHANICAL, CHEMICAL AND GENERAL SCIENCE.

VOLUME XC., No. 10. Whole No. 1,761. | NEW YORK, MONDAY, MARCH 8, 1909. | $3 PER ANNUM, IN ADVANCE.

A. M. CALLENDER & CO., Proprietors. C. H. WADELTON, Manager. THOMAS J. CUNNINGHAM and ELBERT P. CALLENDER, Editors.

ENTERED AT THE POST OFFICE AT NEW YORK, N. Y., AS SECOND-CLASS MATTER.

CONTENTS.

An Asterisk (*) Denotes an Illustrated Article.

EDITORIALS—
Briefly Told 397
Illuminating Engineering Society's Section Meetings.
No. I.—Review of the Second Annual Report of the Wisconsin State Railroad Commission, by Mr. H. Thurston Owens 397
*The New Home of the Old Baltimore Retort and Firebrick Company 398
*Gas Works Shop Economy, by "Engineer" 400
Proceedings, Third Annual Meeting, American Gas Institute—Continued from Page 360 400
Second Day, Morning Session—Joint Discussion Continued—Speech by Dr. Hyde—Third Day, Morning Session—Report, Bureau of Information—Report of Board of Revision of the Question Box on the Manufacture of Gas.
Proceedings, Thirty-ninth Annual Meeting, New England Association of Gas Engineers 403
First Day, Morning Session—A Fraternal Token—Report of Board of Directors—Election of New Members—Inaugural Address.
Second Annual Convention, Indiana Gas Association 406
First Day Morning Session—Welcomed by Mayor Bookwalter—The President's Response—Some Routine—Roll Call—Report of Executive Committee—Report of the Secretary-Treasurer—History of the Association—Inaugural Address.
*Electrical Measurement of Gas Temperatures, by Mr. Chas. E. Foster 408
BUREAU OF INFORMATION, THE AMERICAN GAS INSTITUTE 409
Addendum to Question No. 48.
ITEMS OF INTEREST FROM VARIOUS LOCALITIES 410
Manager Heryford to Have an Additional Holder—Hints from Lincoln, Neb.—Mr. Foshay Leaves Fort Dodge, Ia.—Death of Mr. Isaac Crawford—Strike-up-the-Band—A Maine Bill—Going on Nicely at Chattanooga—The Anaheim Company Expands—Personal—Asks the Right to Increase Rates—An Oregon Bill—Annual Meeting, Meriden, Conn.—Proposed Company for Parsons' Mills, Pa.—The Failure will Cost $11,000—And Other Items.
The Market for Gas Securities 412

BRIEFLY TOLD.

ILLUMINATING ENGINEERING SOCIETY'S SECTION MEETINGS.—We learn from Mr. L. D. Gibbs, Secretary of the New England Section of the Illuminating Engineering Society, that its next meeting will be held, at 7:30 P.M., the 16th inst., in the Auditorium of the Edison Building, 39 Boylston street, Boston. The Secretary promises that a very interesting and instructive paper will be read on "The Simplification of Illuminating Problems Through the Conception of Light Flux," by Mr. J. S. Codman. We are glad to know that this paper is to be an instructive one (those put up by Mr. Codman usually are), and that it tends toward simplifying things. A glance at the wording of its title, however, would seem to indicate the necessity for saying directly that the text will be less imposing than its titling, always presuming that lengthiness of titling may also mean facility for description. However, we may all chance that. Secretary Gibbs remarks that the February meeting was full of interest, despite the fact that the attendance was comparatively small. He also intimates, and properly, that "There is always an inspiration in numbers." Come to think of it, though, there was quite some effective reasoning for the comparatively small attendance at the Boston meeting of the Society last month, since on the night in question even "all-to-the seasoned" Bostonians complained bitterly over the stinging sleet storm that was nature's portion for them the evening in question. Wherefore, all hail to the heroes who braved the pelting for the sake of science, and doubly do we say "Amen" to Secretary Gibbs' pronouncement and exordium in the two sections: "One cannot forecast from the subject the possibilities of discussion. We owe it to each other to attend this meeting." There will be little to fear for a good meeting, though.

The regular meeting of the New York Section of the Illuminating Engineering Society is named for 8:15 P.M., of Thursday, the 18th inst., which it should be noticed is a week later than would in the regular order of things have been named for it. Of course, the session will be held in the lecture hall of Engineering Societies Building. The paper list carries two numbers, which both discuss the theoretical and practical sides of illumination. One is from the thought of Mr. Bassett Jones, Jr., who will discuss "The Mathematical Theory of Finite Surface Light Sources." The other is by Mr. Albert J. Marshall, who will narrate how the illuminating of the editorial offices of the New York "World" is accomplished.

[Prepared for the JOURNAL, by MR. H. THURSTON OWENS.]

No. I.—Review of the Second Annual Report of the Wisconsin State Railroad Commission.

The State of Wisconsin contains 56,040 square miles, which is about equal to either the combined area of New York and New Jersey or England and Wales.

The population (2,230,000) is about the same as that of New Jersey, Michigan or Iowa. The largest city (Milwaukee), with a population of 320,000, is the 13th city in size in the country, but it is the only city in the State with over 40,000 population—Superior, Racine, Oshkosh and La Crosse range from that figure to 29,000.

The Railroad Commission of Wisconsin, as originally organized, supervised railroads only, but before the body had been in office a year its duties were considerably enlarged, so that for the year ending July 1, 1908, it was charged with the supervision of all other public utilities, including water, gas, electric light, heat, power and telephone companies. In addition, it has jurisdiction over the issues of securities by railway and other public utility corporations, and the power of determining whether public necessity and convenience demand the building of additional lines of railways, or additional water, gas and electric plants in communities where there is in operation a plant of similar character under an indeterminate franchise.

It is charged with the duty of prescribing proper and uniform accounting methods, and of requiring from all companies under its jurisdiction reports containing operating and financial and other data, including schedules of rates charged for the service rendered.

Utilities Under Supervision.—The number of public utility companies, persons, firms, etc., operating in the State, number as follows:

Steam railway	54
Street and interurban railway	25
Express companies	7
Telegraph companies	2
Gas companies	52
Electric light and power	230
Water	141
Telephone	569
Heating	13
Total	1,093

LIBRARY OF CONGRESS MAR 8 1909 SMITHSONIAN DEPOSIT.

Comparing the number of gas and electric companies, etc., supervised by the Commission in Wisconsin, with the other public utility commissions which have been established in this country, one finds the following results:

Massachusetts Board of Gas and Electric Light Commissioners	164
Public Service Commission, N. Y., 1st District	25
" " " 2d "	469
Wisconsin Railroad Commission	282

Uniform Accounting.—The principal work which has engaged the attention of the Railroad Commission has been in establishing a uniform system of accounts and of obtaining a valuation of all public utility properties. Numerous conferences have been held respecting the former, which have been duly noted in previous issues of the JOURNAL.

Valuations.—Tentative valuations were completed in 18 instances, and 11 more were in progress, up to June 30, 1908.

Respecting the valuation of the physical property the Commission states that its method of procedure has been as follows:

1. The preparation of a detailed descriptive inventory.
2. Field examination by a trained staff.
3. Determination of the cost, new, of each item.
4. Estimation of the depreciation of each machine or other item of property.
5. Calculation of the present value.
6. Summing up the detailed valuations by groups.

Regarding the cost of reproduction of property, new, the Commission availed itself of a large amount of data from engineers and manufacturers, as well as from the companies themselves, and have based their valuation upon the average price for the 5-year period immediately preceding the date of valuation whenever practicable. In this way it was hoped that any unusual fluctuations in price would not materially influence the results.

Depreciation.—The Commission thus declares itself regarding depreciation:

Depreciation of Value.—"In determining the allowance to be made for depreciation in value, due consideration is given by the staff to the actual conditions of each machine or other item of the property, taking into account also the age of the machine in connection with its probable ultimate efficient life, the character of the service, the standard or quality of maintenance, and such other elements as may aid in reaching a reliable judgment. In the steps leading up to such final conclusions, accumulated experience with reference to closely similar property, maintained to a like standard and operated under identical or similar conditions as to service, etc., receives due recognition. The individual item of physical property is judged with reference to its agreement with or departure from the average of such related group or class of property in fixing the probable useful life and in estimating the depreciation. Results obtained by this method in the valuation of physical properties of Wisconsin railroads and public utilities, aggregating many millions of dollars, have established the reliability of the method above described."

Present Value.—The present value is determined as follows: "The depreciation percentage is customarily applied against the net or service value, found by deducting the scrap or residual value from the new value. The so-called "present value" is then determined by combining the scrap value and the depreciated service value."

Classification of Physical Property.—The tentative groupings of physical property of gas works are as follows:

1. Land.
2. .....
3. Holders.
4. Distribution system.
5. Power plant equipment.
6. Buildings and miscellaneous structures.
7. Office furniture and appliances.
8. Tools, implements and machinery.
9. Horses, wagons and miscellaneous.

Total of items 1-9.

10. (See note below.)

Total of items 1-10.

11. Stores and supplies.

Total of items 1-11

12. Paving.

Total of items 1-12.

Note.—Addition of percentage to cover engineering and supervision, interest during construction, contingencies, etc.

Rates and Service.—During the year the Commission took action regarding rates and service in the cases of 17 electric light and telephone companies.

Gas and Electric Service Inspections.—A report of the gas and electric service inspection was issued in pamphlet form some time ago, and should be in the hands of every gas engineer who has not already obtained a copy.

During the progress of these investigations it has been found, "that in various instances companies have been needlessly hampered by certain municipal regulations, the purpose of which was to insure good service, but which were actually ineffective."

Tests of gas service were made in 20 cities, and of electric service in 9 cities.

The New Home of the Old Baltimore Retort and Firebrick Company.

[Prepared for the JOURNAL, by "R."]

Illustration, Fig. 1, shows the new home of the Baltimore Retort

Fig. 1.

and Firebrick Company, at Locust Point, Baltimore, Md., and gives an idea of the capacity of this, one of the largest retort making plants in the country. It also shows its facilities for both rail and water shipments. At the southern, or front end of the building, the Baltimore and Ohio Railroad tracks are on Nicholson street, with a private siding the full length of the plant along the western, or Hull street side, while at the other end of the plant runs the north branch of the Patapsco river.

At the extreme left of the picture is shown the office building, the the first floor of which is occupied by the general offices, while the second is used by the engineering and drafting departments. A fireproof vault that extends from ground to roof, is equipped with fixtures for the systematic filing of all books, papers, B/P., etc., so, should another fire visit the plant, valuable data will not be lost.

All orders for special shapes are sent to the drafting room where shrinkage is figured and corrected drawings and templates are made for the use of the pattern and mould shops, which immediately adjoin, occupying the front part of the second floor of the main building. Along the front of the ground floor are boiler and engine rooms, each inclosed with fireproof walls and ceiling. Automatically closing fire doors complete the protection from any fire starting in these rooms. All power machinery is close to engine, so loss by transmission is reduced to a minimum. The mill for pulverizing dry clay is to the side and all others to the rear.

After the dry clay is ground in this mill it is conveyed, by bucket elevator, to the second floor, where the proper proportions of each material are automatically mixed and dropped into bins, with mouth at base, where it is bagged for shipment alongside of the large doorway about the center of the building.

As clay is delivered to the plant it is stored along the siding on west side, convenient to a large door close to wet pan or mixing machines (Fig. 2), on the other side of which are a Champion crusher and dry pans for preparing grog or ground firebrick. After passing through dry pan the grog is carried by link belt conveyor to a revolving screen on the second floor, where it is separated into its respective bins according to size of particles. These bins and others for storage of various materials have outlets near the wet pan, which is a long step in the direction of economy by saving handling and carrying.

After materials for brick shapes have been thoroughly mixed in the wet pans they are conveyed, by canvas belt, to a Carnell soft-mud, brick machine, where the proper quantity is roughly moulded into the shape of a brick. These rough shapes are then taken on trucks made for the purpose, to the dryers, which are of this Company's own construction, and utilize waste heat and exhaust steam. Their arrangement is such that bricks do not have to be carried any distance to the hand represses in which they are really made. Part of these dryers can be seen back of the workmen on the left side of the picture.

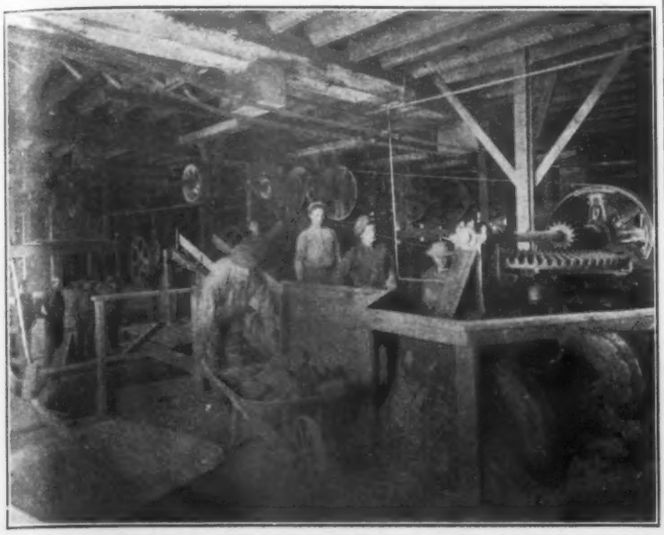


Fig. 2.

This process costs more than auger machine with wire cut, but the superiority of the product more than compensates for the difference.

Making firebricks by this, the soft-mud process, and repressing them, assures a compact mass entirely free from any lamination or spiral grain, which wear evenly and cut accurately, thus requiring less time to lay. No method has yet been discovered by which the laminations made by auger machine can be eliminated. This characteristic frequently necessitates cutting several bricks before the desired size bat is obtained; and it also creates a tendency to peel off, especially where laminations are close to the surface.

After the bricks are repressed they are placed in dryers with higher temperatures until they are dry enough to be placed in kilns. Each part of this process carries the bricks nearer the kilns; and warehouses are just beyond the kilns, so nothing passes the same point more than once.

Materials for tile department, which is on the second floor, are carried by by-pass to the bucket elevator shown to the left of the brick machine. This elevator deposits them close to moulders' tables. In this department innumerable shapes and sizes are moulded, sizes alone varying from one-sixth of an ounce to several hundred weight each. This floor is laid in sections, some of which have spaces between boards, so heat that escapes from the dryers is given another chance to expedite drying tile. At the rear of this department is an elevator to lower shapes to the ground floor in front of kilns.

Another by-pass is in position to carry materials for the retort department to the right of the brick machine, past crusher, to frames, in which it is tamped or rammed into blocks of a size convenient for the moulders' use. This tamping greatly improves the material, having an effect similar to that obtained by tramping, which is still the only satisfactory method of mixing clays for some work, notably for glass works' practice.

On the far side of these frames is the retort moulding department, the floor of which is covered with tracks running the full length of the department, with a cross track at each end for switching purposes. Steam pipes are laid between tracks and there is plenty of head room.

As a retort weighs about one ton when it is burned, and considerably more before the water is driven out, it is not a simple matter to handle them in process of manufacture; and the methods used at these works are the result of many years' experience, both in this and foreign countries. Of first, and vital, importance is the question of materials, which are all carefully selected, tempered and aged to thoroughly disintegrate all particles of clay and make a most homogeneous and plastic mixture.

A retort is moulded, or built up, vertically in sections or a car, from which it is not removed until it is ready to be placed in the kiln, then it is transferred to a truck that is constructed to lift the retort bodily and supports it so there will not be a strain on any part while placing it in position in the kiln.

The advantages of this method of manufacturing retorts are that each block of clay, as it is beaten against that next to it, presents a rough surface against a rough surface, thereby insuring a proper bond; furthermore, the water, which is the essential feature in tempering, is not continually forced to the top of the body, but remains active in the clay and performs its function of tempering. This is not the case when the ramming process is used. By placing a quantity of ground grog under the retort while it is on the car, shrinkage is taken care of, which does away with the danger of cracks in the back of the retort, adding another precaution against leakage of gas.

Retorts are finished on the outside with a mixture of high, fire-resisting clay, which make a smooth finish and an extra fire shield, thereby increasing the life of the retort. An additional advantage of this method, over that of ramming, is that the moulder can always see his work as it progresses, so there is no danger of leaving holes due to being so far from his work and unable to see the effect of each operation.

Fig. 3.

Fig. 4.

The same thorough care is exercised from beginning to end of making retorts. At no time is the next section placed before the body of the lower one has been hedged and scraped to assure a uniform and complete bonding of clay, and nothing is permitted to interrupt the moulder while he is making a complete retort, consequently there is no danger of the clay ever setting or drying. Special attention is given to making the retort perfectly straight and accurate in dimensions.

Kilns of special construction for burning retorts are at the rear of this department, in which they are burned at a very high temperature, and, when ready for the market, are examined carefully before they the factory.

Kilns for bricks and tile are alongside of the retort kilns, in the rear of the departments in which these shapes are made. These are regular down-draft kilns, with capacity of 36,000 bricks each.

Fig. 5.

Fig. 6.

A railroad siding extends to kilns, and the warehouses are in rear of them towards the wharf. A brick fire-wall extends across the full width of the main building, separating it completely from the kilns, access to which is obtained through openings that are equipped with automatically closing fireproof doors.

Gas Works Shop Economy.

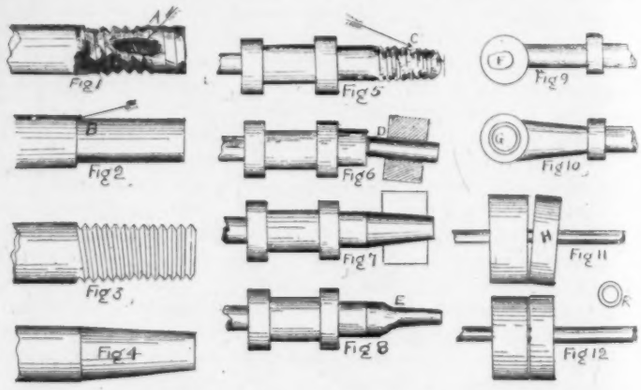
[Communicated by "ENGINEER."]

Not long ago I saw a number of pipes thrown about in a certain gas works shop, and an examination of them showed that, while the pipe walls were in good condition, the threaded ends were misshapen, worn, corroded and generally defective, as shown at *A*, Fig. 1. The threads were so bad in places on some of the pipe ends that it was an impossibility to get a perfect or even tight joint. Therefore, rather than remake the ends, the pipes had been cast to one side. I was told that the workmen intended to restore the pipe threads some day, thereby preserving the pipes for further service; but the some day had not yet come. And it goes about the same in many places—no care is taken of much of the rejected material. Pipe ends which might be saved for long service are thrown off as useless. In the case of the average pipe thread, the worn order may be rectified and the pipe used again, but simply return cutting the thread. Often the thread is too far gone for this purpose. Then, if the pipe wall is thick enough to allow, the exterior surfacing may be turned off in a lathe, leaving the end as at *B*, Fig. 2. There will be a shoulder presented, but that will not matter, as a new field is given on which to work. An entirely new thread can be cut, as in Fig. 3. Sometimes, instead of proceeding according to this plan, the workman turns the end of the pipe down to a tapering order, as in Fig. 4.

Much, of course, depends upon the nature of the pipe. If the wall is too thin, this cannot be done, but if there is some material to work on, the end of the pipe may be turned off to the cone-shape, or other pattern, and a thread cut. In this way, considerable valuable piping may be saved for future use. The writer has mentioned this because of the apparent waste of pipes merely because of the loss of the threading.

The same idea applies to much of the bolted work about a gas works. All kinds of shafts, cores, spindles, rods and the like are in use in a modern gas works in which machinery is employed to any extent. There are pump-rods and engine-rods, there are links and there are buffers. Now, then, the writer has noticed considerable valuable property of this class thrown on the junk heaps because of the "goneness" of the threading plan. Fig. 5, for illustration, shows a condition at *C*. The thread is entirely worn off at places. This appears to be ample excuse for many workmen to discard a rod, spindle, stud, etc.; but that is not the right thing to do. The worn threads of the stud can be recut, and the cutting may be done on the old ground, or a new ground can be made by turning the imperfect material off, as in Fig. 6. However, if the material is cut off, so as to shape a shoulder, there is danger of the point breaking off at the weak part *D*, Fig. 6. Hence we notice that some men wisely overcome this trouble by turning fhe end down to a cone-form, as in Fig. 7. Others proceed to make the shape shown at *E*, Fig. 8. After the shape is made, the procedure of cutting the new thread is easy. But the shop economy is not applied entirely to pipes and shafts. The working parts of meters, gas engines, pumps, fans, motors, etc., are constantly wearing. I saw a number of connecting rods thrown out because the bearing at one end was worn like at *F*, Fig. 9. These rods were ultimately saved and used again by boring out a hole large enough to make the cavity round for the insertion of the ring or sleeve, *G*, Fig. 10. This sleeve was heated and inserted hot.

The law of economy on things of this character likewise applies to the frictional bearing, contacting sleeve or hubs of wheels. Hence the loose pulley *H* is wobbly and running sidewise, due to a worn bearing. Instead of casting the wheel to the old machinery pile, a boring of the hub may be made, as in the case of the connecting rod, and the new sleeve *K* inserted. Then the wheel will ride upright, as in Fig. 12. And one could go through other mechanical devices and



parts in the gas works shop, only to find instances in which dollars might be saved in working up the old parts in intelligent way.

[FURNISHED BY THE SECRETARY.—Continued from Page 360.]

PROCEEDINGS, THIRD ANNUAL MEETING, AMERICAN GAS INSTITUTE.

HELD IN NEW YORK CITY, OCTOBER 21ST TO 23D, 1908.

SECOND DAY—MORNING SESSION.

Joint Discussion.—Continued.

Mr. A. S. Miller—Mr. Chairman, as the time is short, I will simply ask permission to contribute later a few words to the Publication Committee on the subject of Ornamental and High Efficiency Lights. The latter subject was referred to by Mr. Brown. I am amazed at the progress of the gas industry. A man has stated here that the so-

called gas arc light is not entirely satisfactory, and he has not been torn to pieces! I should also like to ask Mr. Litle whether it is entirely safe to put this type of light over the heads of people in a public auditorium, whether there is any danger of breakage and falling of broken glass. [The following remarks were contributed by Mr. Miller later on:] In treating this subject Mr. Litle has failed to emphasize the importance of artistic illumination. A larger number of people are prepared to pay any reasonable amount for light and will not object to the expense, if the effect of the lighting is pleasing. This feature has been largely ignored by those interested in gas lighting and, as a result, we have lost much business to the electric light companies which could otherwise have been retained. Mr. Litle has also failed to refer to high efficiency lights. There has been on the market, in this country, a lamp which would give from 30 to 35 candles per cubic foot of gas burned. It is not beautiful, but it is well adapted for lighting where large units are satisfactory and 6 feet of gas in this lamp gives 200-candle power. It is surprising that the incandescent lamp manufacturers have done so little towards developing this type of lamp. One of the larger gas companies in this country, finding it impossible to secure just what it needed in this line, was compelled to have the lamps made for its own use. These lamps proved to be eminently satisfactory and should be in much wider use. Mr. Brown has already referred to very high efficiency lamps using compressed air, but there is room for lamps of medium efficiency between the ordinary Welsbach and those requiring mechanical aids.

Mr. Searle—In connection with Mr. Litle's paper, the hidden vein of tungsten appears. Mr. Brown remarks that the gas man is apologetic. If Mr. Brown had attended as many electric meetings as I have lately, he would know that the electric men are saying, "We have got the tungsten lamp now and we can do as well as gas." There can no question, gentlemen, there is going to be a survival of the fittest for certain classes of illumination. We should not deceive ourselves, some people would not take gas as a gift, while others would not take electricity as a gift. The reduced electrical consumption means a higher cost per kilowatt hour for an isolated steam plant. That means a cinch for the gas engine. You should be as familiar with the tungsten practice as you are with the inverted lamp brackets. The company that I represent, felt 2 years ago that it was necessary to organize a commercial engineering department to follow along intelligent lines the applied science of both gas and electric lighting, as best adapted to the interests of the consumer, and if you were in the position I occupy, you would know that it is best to tell the consumer the absolute truth, without bias, in each individual case. The tungsten lamp started out with a claim for an ideal officiency. The tendency seems now to be to admit a higher rate of consumption in the tungsten lamp; for instance, they now claim 1¼ watts per candle, instead of 1¼ watts; that raises the cost of tungsten *versus* inverted light illumination a peg or two and makes the situation easier. I have not felt that we want to discourage progress in either light, because I have always felt a man who stood in the way of progress would get a bump. The electrical people are looking toward the displacement of gas with tungsten lamps, as the salvation of their business; but the same equation would exist as it has existed in the evolution of the lighting business mentioned by the first speaker. A reduced electric consumption means a re-adjustment of rates, leaving the electric light bill, on the basis of present profits, where it stands to-day. The same opportunity for competition then comes to the gas man to enter and secure the business or hold it, so that if we keep up our progress in lighting we have nothing to fear from the progress of our competitor.

The President—Mr. Gartley, will you take the stand?

Mr. Gartley—I just want to say that we have an opportunity that we ought not to miss of hearing once more from Dr. Hyde, who is here on invitation, and who has represented the Bureau of Standards in the past on a number of matters affecting the gas business, and very largely in this matter of photometry and in the determination of the unit of light. If Dr. Hyde were not here I should be very glad to take a few minutes to say a few words about his international reputation as a photometrist, and regarding the spirit of fairness and common sense mixed up with the scientific abilities with which he has treated the illuminating industries in his department. [Applause.]

The President—If Dr. Hyde were not present I should like to follow up Mr. Gartley, and make some remarks in the same line. I have no doubt, gentlemen, without putting it to a vote, that the privilege of the floor is extended to Dr. Hyde.

SPEECH OF DR. HYDE.

Dr. Hyde—Mr. President and Gentlemen: It is with the greatest pleasure that I have received the privilege of speaking to the members of the Gas Institute once again, and the pleasure is more intense because I can speak on the subject on which I spoke last year, and on which I have been speaking to audiences during the day, and to myself as an audience at night, during the past year. I make a report as a committee of progress. With the very short time at the disposal of the Institute for the discussion of the valuable papers that have been and are being presented, I do not feel as though I should take the time to elaborate at all what Mr. Gartley in his report has so carefully and so well stated. I do want to take advantage of the opportunity to express my personal gratification—and I think in doing so I am reflecting the feeling of the Bureau of Standards in the matter—our gratification at the way in which the various technical bodies, and in particular the American Gas Institute, have endeavored to suport the Bureau of Standards in its overtures in regard to an international unit of light. The work is progressing well. The other two bodies, the Illuminating Engineering Society and the American Institute of Electrical Engineers, have already adopted the resolution, and I sincerely feel that the American Gas Institute is right behind them in it. They having more at stake are well justified in proceeding slowly, and I think they are entirely right in waiting for final action until they know, through a definite test of a lamp which has been used as their standard, how their standard will stand as compared with the proposed international standard. I might say in closing that the Bureau of Standards has already made some overtures abroad in regard to an international unit, and I believe that if the Gas Institute joins with the other two societies in indorsing the proposals of the Bureau, and in indorsing the resolutions looking toward an international unit, that England and France will enter into the conference with the United States in agreeing upon a national unit. We all have admitted—it was easy for us to admit—that a common international unit is a good thing; but it is a different matter to decide offhand whether such a change as has been necessary in order to bring about international unity was feasible. I certainly feel that the Bureau of Standards has believed all along that if the adoption of an international unit would entail any serious loss to the industries of this country that we ought to stop immediately any act looking towards its adoption. I believe that, as things look now, there is not going to be any great loss, and certainly the interests, industries and societies of the country have most nobly come to the support of the Bureau in bringing about this desired end. I thank you. [Applause.]

Mr. P. Thompson—In connection with Mr. Bond's paper I think it might be interesting to note some developments that have taken place since he wrote it, in connection with the difficulty in the shipment of pentane. Formerly the railroads refused to take pentane except under very onerous conditions, and in some cases absolutely refused to transport it. The express companies have absolutely refused to handle it under any conditions. In taking the matter up with the railroads for the purpose of trying to persuade them to accept it for shipment, we were referred to Col. Beverly W. Dunn, who was detailed by the United States Government, at the request of the Inter-State Commerce Commission, to take up the general question of the shipment of inflammable liquids and decide what regulations and rules should be required by the railroads for the safe shipment of merchandise of this nature. At the time we first took the matter up pentane was on the tabooed list. After consulting with Col. Dunn I am glad to say he has recommended to the railroads that the shipment of pentane be allowed under conditions which I think will make it possible for anyone to forward it; and the railroads have accepted his recommendations. Anyone who is interested can write to Col. B. W. Dunn, 46 Park Place, New York city, and he will give them the rules and regulations covering such shipments. Briefly, the regulations provide that pentane can be shipped in small cans, similar to tomato cans, of a strength under which, under certain degrees of temperature, will not burst, each can holding sufficient to fill one of the containers of the pentane lamp. Col. Dunn advises me, by recent letter, that he has taken this matter up with the express companies and he is very hopeful they will modify their rules so as to accept pentane for forwarding when shipped in containers such as he has approved of for the railroads.

Mr. G. Barrows—I should like to ask Mr. Litle if they have found any points for the jump spark lights, especially with the inverted lamp, which they are absolutely sure will not corrode or fail under the ordinary conditions of use. What provision has been made to ad-

vise the person using the parts that the parts are, or are about to be, played out?

Mr. H. T. Owens—Regarding certain statements in Mr. Bond's paper, I would say that the question of illumination does not enter into the value of light sources. If we determine the MSCP we have a value which is comparable for all light sources. Regarding better gas illumination, it is quite as important to arrange our lighting systems so that lamps of high intrinsic brilliancy will be kept out of the line of vision, as it is to provide a satisfactory amount of illumination. Respecting Mr. Searle's remarks regarding the tungsten lamp, I do not believe that the use of current, owing to the introduction of these lamps, will be materially reduced, and as an example, would cite the conditions in the gas business since the advent of the mantle lamp. In the past decade there has been an increase in sales per capita of gas for lighting purposes of at least 25 per cent.

The President—Before calling upon the several authors to wind up the discussions, I want to make one point in regard to Mr. Litle's paper on the question of illuminating engineering. While believing thoroughly in the advice that has been given that we gas men should pay more attention to illuminating engineering, I deprecate any statement that intimates that we have never given any attention to the subject, yet it is an opinion held by the electric light men, and the remarks of Mr. E. L. Elliott seem to tend in the same direction. At a meeting, held about 1½ years ago, by the members of the Illuminating Engineering Society in connection with the matter of unit of light, I noticed all through the discussion, wherever the subject of illumination came up, the tendency, perfectly honest, to take the position that no illuminating engineering had been undertaken by gas men. I finally stated, after the meeting had gotten through with the business in hand, that while I thought I could give a great many examples to disprove any such position, I should like to ask what particular things they could point to as indicating the beginning of their profession, and they pointed to indirect illumination; and, asking more specifically what they understood by that, they spoke about cove lighting. I then stated I felt very sure I could place before them information to indicate that the gas men had done that before electric lighting was practically known. I referred to the illumination of the Philharmonic Hall, Liverpool, and I knew perfectly well that that had been lighted by indirect illumination reflected from the ceiling with the lights out of view, for some 60 years. That was my impression at that time; that I myself had seen it 10 years ago, and had never seen a room with a better class of illumination. I, therefore, wrote to my friend, Mr. William King, and asked him if he would give me an account of the illumination as installed in that hall by his father. I cannot do better than to read from the letter which he returned to me. I would say before doing that, however, that the electrical engineers were most generous in their treatment of my statement. They said they were delighted to hear anything new in that line. They said they would welcome a statement from me and would put it in their "Proceedings." I really have not had the time to prepare a paper, and I think this is a good opportunity for me to get it on our record without going to that trouble. [Reads letter.]

5 Beach Lawn, Waterloo, Liverpool, England.

Philharmonic Hall, Liverpool, England.—This hall is the property of the Liverpool Philharmonic Society, and is use, chiefly in the winter months, for high class concerts, and is occasionally let for public meetings. It holds 3,000 persons and is one of the most beautiful concert rooms in Europe. It was completed in 1849, and the method of lighting was invented by my father, the late Mr. Alfred King, M. Inst. C. E., who for many years was Engineer to the Liverpool Gas Light Companies. A pipe was carried along the cornice, as shown on the accompanying drawings, and to this a number of triple, flat-flame burners were fixed, thus giving a continuous row of lights. The effect was most brilliant. The whole room was filled with light, and the burners were so far above the audience that no inconvenience was experienced.

The coved ceiling above the lights was filled with panels of lattice work, and thus the hot air from the gas found a ready means of exit, and, causing a strong upcast current, formed an admirable means of ventilation, no down draughts or eddies of cold air being felt.

A few years ago the gas burners were removed and a row of incandescent electric lamps were fixed in their place and in the same positions. The result was very unsatisfactory. The light was not nearly so brilliant as when gas was used, and in consequence of the want of the warm upcast from the gas flames, continual complaints are received of want of ventilation and the descending currents of cold air.

It will then be seen that nearly 60 years ago, the system of "cove" lighting by gas had been successfully introduced in Liverpool.

[Signed] William King, *M. Inst. C. E.*

The sketches necessary to explain the proposition, though it is perfectly understandable without, accompanied the letter. Does anyone else wish to speak before we call upon the authors of the papers? Mr. Bond, will you reply to those who have discussed your paper?

Mr. Bond—The first point was made by Mr. Forstall on a question of the outlet of the station meter as a proper place from which to derive the sample gas. The very point made there is that this is the place to determine the candle pwer for works gas and for works purposes; if you are going to meter your coal and water gas, and mix them immediately afterwards, as is done at a great many works, it would be impossible to get the candle power at a later point along the line. Even if that were not so, and you were making water gas only, I think that, through the use of this cooling coil I have mentioned, at 60° you would do away with any possibility of pseudo-enrichment at that point, because it will be brought down to 60° anyway. Of course, if a man wishes to tamper with his photometer line and introduce benzol, pentane or something else, he could get good results anyway. Another criticism was that, in putting this gas into a small sample holder and collecting it for 1 hour, the gas would be subjected to "wire-drawing." The holder mentioned was of between 5 and 10 cubic feet capacity. The rapidity of flow of gas that you send to your photometer is 5 feet per hour; it will not wire-draw any more going into the holder than into your photometer burner, so that the criticism is just as applicable in one as the other. That is, conceding all the time that the wire-drawing is having a real effect on the gas and that the effect is not due to a state of low temperature at the point of wire-drawing, rather than something else. Ambiguity is charged as to what was meant by proper burners, saying that I referred at one time to the Carpenter burner, at another time to the Grafton or Parliamentary burner. I spoke of these as types of burners, not necessarily recommending either the Carpenter or the Grafton or Parliamentary burner, though they do indicate a type of burner which we should investigate. As stated before, there should be tests made to find if a burner is not possible in which both air supplies are capable of such regulation as would, for the type of burner specified, give a maximum efficiency for the usual range of illuminating gases. Now, the Grafton burner, while having one shutter that controlled both the external and internal air supplies, has those air supplies proportioned by the size of its apertures. I would like to have the regulation such that both the internal and external supplies of air could be properly determined, in order to find the maximum illumination from the gas, just as the calorimeter finds its maximum heating value. A gentleman, whose name I do not remember, spoke of the Carpenter burner as being satisfactory up to 21 candles, but above that the flat flame burner was better.

The President—It was Mr. Dewey.

Mr. Bond—I think, perhaps, there may be places in the country where more than 24-candle gas is specified, say 25 candles. Now it is found that the Parliamentary burner is more satisfactory than the Carpenter burners for 24 candles, and it is due to science that we should secure an efficient burner for the entire range of gases. Perhaps here would be the proper place to introduce a subject germane to this. This paper seems contradictory in one way, in that I have gone on arguing for a better type of burner, a scientific burner, with which to photometer our gas, and yet in the concluding remarks I have made provision for the time when the candle power method of testing gas would be done away with entirely. There has been some talk—in Wisconsin it has gone further than talk—of submitting a test on a calorific basis instead of a photometric one. Laws are made as a result of public opinion largely. Public opinion thinks that 16-candle power coal gas is about 650 or 700 heat units, and it thinks 22-candle power water gas has an equivalent value. That opinion has been formed with the use of some old form of burner. It has not been based upon a form of burner which is scientific, and the gas companies in Europe are finding that out. Now I submit that in the past, and up-to-date, we have been using the cream of the raw material we get—the cream of the oil, the cream of the coal; but the time is coming when there will be no more cream. Then what are we going to do? Are we going to back water then, or are going to back water now? I think if the proper type of burner can be put before the public, a scientific burner, and they can be educated to understand that a 16-candle power coal gas through an old flat flame burner is not equivalent to 670 heat units, you have achieved the purpose in view. You have staved off the day of turning over a calorific qualification until the people can understand what 670 heat units are equivalent to. M. St. Clair Deville, of Paris, in his very able paper of this past year, seems to have arrived at the conclusion that the calorific power and the illuminating value of gas, as witnessed through the mantle,

were about parallel, and if you will look through his experiments you will find that, with many gases of varying calorific values, he finds that the number of British Thermal Units necessary to produce 1 candle power is fairly constant. He makes no provision for the Keith light, which comes later and gives you 60-candle power to the cubic foot! So that Dr. Bunte's contention that flame temperature enters in here very strongly is brought again to the fore. One point of view is that we are carbon merchants, almost as much as are people who sell coal by the ton. It is *carbon density* in the gas that will eventually measure its value. I think you will find, if you take natural gas where there is a great increase of hydrogen, you will not get as high illuminating value through a mantle from a cubic foot containing 1,000 heat units, as you will with the same quantity of artificial gas where you have 670 heat units. To return to the comparison, the coal dealers carry their carbon in wagons at 2,000 or 2,240 pounds to the ton, that is, in a solid state; we convey our carbon in a fluid or gaseous state, with hydrogen as a carrier, but after all it is practically the same kind of a sale.

Mr. Litle—One point asked about is the lowest practical pressure to be used in connection with the inverted light. That varies with the gas. Carburetted water gas can be operated under lower pressure in an inverted burner than straight coal gas. I have seen burners apparently work pretty well with 1-inch pressure on carburetted water gas; with coal gas the pressure has to be about 1½ inches to work properly—that is, the minimum pressure. However, I find in most cities of the country so low a pressure is not considered sufficient for the consumer, and the tendency is to increased pressures. There are certain points in all localities where the pressure is likely to drop, and where it drops below the above stated minimum pressures you will have trouble with the inverted burners. I should like to call your attention to another fact in this connection, that the inverted gas light will stand quite a range of variation in pressure and still operate apparently satisfactorily. A 25 per cent. variation in pressure will not interfere with good results, as far as the consumer can see, without re-adjustment of the burner, but a variation or change in the gravity of the gas proves very disastrous. If you set a needle valve, or the check of a burner, to pass a certain amount of gas at a certain pressure, the pressure can increase or diminish above or below that point for quite a range, and the effect will be simply to vary the candle power obtained. A well constructed Bunsen tube is in a sense automatic. That is, the higher the pressure the greater the amount of air entrained at the air ports; but the best Bunsen tube made will not take care of a variation in the gravity of the gas, and that trouble is experienced in places where mixed gases are in use. Where water gas and coal gas are mixed and the proportion of the two gases changes during the day, there will be required a re-adjustment of burners, even though the pressure remains constant. Mr. Brown calls attention to an intensified lamp, the Keith lamp. I should like to say that I have had quite a little experience in high efficiency gas lamps, working several years in this country with a lamp of about the same efficiency as this Keith lamp, and the lamp at the present time is on the shelf. I think this was due to the fact, as stated in my paper, that its very high efficiency was not absolutely necessary to hold down the business, because, generally speaking, very high efficient units have some drawbacks, and are not simple, because of the employment of some self-intensifying mechanism. What I tried to bring out in the paper was the correct use of the units that we have to-day and also to draw attention to their abuse; that the best thing we have can be so abused as to be a bad lighting proposition, or it can be properly used so as to beat the very best lamp combination on the market. I will not back water for a single minute in the statement that the electrical man has simply been forced to deal with this matter in a different way, because he had a serious handicap. He always has had and still has. Regarding arc lamps I hardly think you will find many tungsten arc lamps on the market. To simply cluster 4 or 5 tungsten bulbs within a big globe is permissible in some places to get artistic effect. That is done in this building, in the corridors and in the floors below, but when you come to commercial lighting—and I speak of commercial lighting as the principal lighting that you have to deal with—then I say the combination is not sufficient, and I say further any electric man will agree with me that he would rather have efficient reflectors in connection with this same high efficiency metallic filament lamp than to simply place his lamp within a large spherical or other shaped globe. With reference to Mr. Barrows' question about the jump spark system, I would say the spark points used have been carefully experimented with and we have not had any trouble in that connection. I should like to say, however, that I believe it necessary to have a certain supervision over such installations. I do not think it at all practical to put a jump spark lighting system into a consumer's store and then forget it, because he would likely not renew the parts at the proper time, and might allow the system to fall into disuse. I think it has been well demonstrated in connection with the gas arcs, that the consumer will not properly care for his lighting fixtures and you have to do it for him, or at least help him. I believe that answers the questions.

An adjournment to 10 A.M. of the following day was here ordered.

THIRD DAY—MORNING SESSION.

The President called the meeting to order at 10 A.M., and asked Chairman Baehr to read the

REPORT OF THE BUREAU OF INFORMATION.

[For the text of the Report, see JOURNAL, Jan, 18, 1909, p. 91,]

Mr. J. D. Shattuck, in submitting the

REPORT OF BOARD OF REVISION OF THE QUESTION BOX ON THE MANUFACTURE OF GAS,

said the Committee was instructed to treat the subjects of coals, carbonization, condensing, scrubbing and purification. That leaves, as you know, a considerable part of the question box not touched upon as yet—questions of general works operation, water gas manufacture, new business and legal questions.

Considerable of the data of the question box, and much of the information referring to the various subject heads, were incomplete, and in addition to sorting out the best answers, we have had considerable information to supply to make the treatise more intelligible.

Some subjects that were incomplete we have handled by asking engineers to write special articles on them, and such articles have been incorporated. It is impossible to give proper acknowledgment to all the gentlemen that have helped us out, but I will especially mention Dr. Harrop, who laid out this broad scheme, and whose matter was turned over to us.

The President—You have heard the report. No action is necessary unless there are some questions you wish to ask Mr. Shattuck. The report will, of course, be printed in full in the "Proceedings."

Mr. Stone—It is only fair to Mr. Shattuck and Mr. Klumpp to say that they did practically all the work of this Committee. When we came to do the actual work, it was found that, although I was a member of the Committee, I was so far distant from the scene of operation we could not work together to advantage. Mr. Shattuck and Mr. Klumpp consulted together and did most of the work.

The President—I am sure the Institute feels very grateful to Messrs. Shattuck, Klumpp and Stone for the work they performed this year. Those of us who sit by and look on cannot appreciate how much work is included in such an undertaking. I want to announce the final Committee which has been appointed at the request of the Director of the Bureau of Standards, at Washington, to assist in connection with the subject of unit of light and other matters, the Committee having been given power in connection with the unit of light, but not power in the other direction, simply to advise with the Directors, and at the Directors' request we have appointed the President, the Junior Past-President, Mr. Gartley and Mr. Glasgow—and particularly Mr. Glasgow, because he and his associates have been working on this matter now for a year or more in London and can do it, of course, with greater facility than can any of the rest of us. I would add to that Committee Mr. R. B. Brown, Chairman Elect of the Technical Committee.

(To be Continued.)

[PROCEEDINGS, AS FURNISHED BY THE SECRETARY.]

PROCEEDINGS, THIRTY-NINTH ANNUAL MEETING, NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

The Thirty-ninth Annual Meeting of the New England Association of Gas Engineers was held at Young's Hotel, Boston, Wednesday and Thursday, February 17 and 18, 1909, under the Presidency of Mr. Walter G. Africa.

FIRST DAY—MORNING SESSION.

The meeting was called to order Wednesday, February 17, at 10:40 A.M.

The President—Gentlemen, you will please come to order. First on the programme is the reading of the records of the last meeting.

On motion of Mr. J. J. Humphreys, Jr., the reading of the minutes was dispensed with, as they have been published.

A Fraternal Token.

Col. Richardson—Mr. President, we all are very sorry to hear of the unfortunate and perhaps serious illness of Mr. Waldo Learned. He, I know, will be thinking of us as we all are thinking of him, and his face will be missed at this meeting probably as much as that of any other member. It is unnecessary to say anything more than that Waldo Learned is sick, and I move you, sir, that the Association, through its officers, send this morning a floral token to him, and with a note of sympathy, in order that he and his family may know that he is in our thoughts and that he is rembembered lovingly by us all at this time. [Seconded.]

The President appointed Col. Richardson to write the proper note to be sent to Mr. Learned.

Col. Richardson—Mr. President, I think my motion was that the floral tribute be sent with a letter from the officers of the Association. It is more fitting that they send a note written by themselves and signed by themselves. I only mention this from a sense of propriety, not from any desire to show any false modesty; it would be nearer what I think the Association should do than for me to write the letter.

The President—We will adopt Col. Richardson's suggestion.

Report of Board of Directors.

The Secretary—Mr. President and Gentlemen: Your Directors would report as follows:

Active.

You have received the following applications for active membership in the Association, and recommend their election:

George Beer, Supt. and Treasurer, St. Johnsbury (Vt.) Gas Co.
Edwin C. Peebles, Manager, Chicopee (Mass.) Gas Light Co.
H. M. Harriman, Supt., Hartford City (Conn.) Gas Light Co.
Herman Burgi, C.E., Springfield (Mass.) Gas Light Co.
John T. Carroll, Supt., Springfield (Mass.) Gas Light Co.
W. G. Meloon, General Manager, Twin State Gas and Electric Co., Dover, N. H.

Transfer from Associate to Active.

G. H. Scranton, Derby, Conn.

And the following for

Associate.

E. R. Davenport, Sales Agent, Bristol County Gas and Electric Co., Providence, R. I.
S. A. Mace, Assistant of Distribution, Lynn (Mass.) Gas and Electric Co.
G. W. Eccles, Assistant Supt., Davis & Farnum Mfg. Co., Waltham, Mass.
W. S. Pratt, Assistant Manager and Treasurer, Perfected Self Lighting Mantle Co., Springfield, Mass.
R. C. Ware, Assistant to the Secretary, Boston (Mass.) Consolidated Gas Co.
F. N. Eisenman, District Sales Manager, Gulf Refining Co., Boston, Mass.
H. L. Sterrett, Manager, Factory Appliance Dept., Susquehanna Ry. Light & Power Co., New York.
G. R. Bradley, Supt., Bartlett, Hayward & Co., Beverly, Mass.
H. Goodwin, Foreman, Willimantic (Conn.) Gas and Electric Light Co.
W. A. Richards, Salesman, George M. Clark Co., Keene, N. H.

The following resignations have been received and their acceptance is recommended: Albert C. Burrage, Frederick S. Pratt, James Dickens.

The following papers are presented for your consideration:

"Street Lighting," by Mr. Edwin Garsia, Boston, Mass.

"Tar for Roads," by Mr. Charles P. Price, Malden, Mass.

"A Comparison of the Enriching Values of Bensole and Gas Oil," by Mr. L. J. Willien, Springfield, Mass.

"Some Results of the Use of Steam and Air Meters in the Water Gas Plant," by Mr. R. E. Wyant, New Haven, Conn.

"The Comparative Practical Efficiency of Various Types of Gas Lamps," by Mr. R. C. Ware, Boston, Mass.

"Why the Gas Man Should Be an Illuminating Engineer." by Mr. Norman Macbeth, New York.

"Calorimetry," by Mr. J. B. Klumpp, Philadelphia, Pa.

Respectfully submitted, N. W. Gifford, Secretary.

On motion of Mr. Morrison the report was accepted.

On motion of Mr. E. R. Slade the Secretary was appointed to cast the ballot of the Association for the names recommended to membership as read. [Seconded and adopted.]

The President directed the Secretary to cast one ballot for the names as read, and the Secretary subsequently reported that this had been followed.

President Africa then read his

INAUGURAL ADDRESS,

as follows:

Gentlemen of the New England Association of Gas Engineers: It gives me much pleasure to welcome you and our visitors, here, to this our 39th annual meeting.

Many of you are probably aware that this is the oldest Gas Association on this Continent, but for the benefit of the new and younger members we will look back to that period when there was no association. A few years previous to the time at which this organization was formed it was practically impossible for one manager or superintendent of a gas plant to gain access to any other works. In these days of courteous interchange of ideas and methods it is difficult to realize that men could have been so shortsighted; but with such a condition existing, the original promotors of this Association, as they have often informed us, had no easy task. It was hard to convince the men who were brought up under such a *regime* that an organization would be to their advantage, but after months of consultation, being satisfied that all would receive their proportion of benefit, persistency and diplomacy did the rest and the New England Association was formed. The first meeting was held in 1871, and from that time the more rapid progress and advancement of our business may be dated. Other associations were soon formed and through them the good work established here has been carried forward. The original organizers of this Association have passed on but they have left this Association. It is now yours and can be made by you what you will.

In the past few years the cost of almost every commodity has advanced. The government statistics show that the average cost of living expenses has increased 20 per cent., but during this same period the price of gas has been gradually reduced. We should see to it that our customers are reminded of this fact. It is through the various gas associations, and the interchange of ideas brought about by the meetings, that we have been able to make reductions in the price of gas, and at the same time return a fair rate of interest on the investment. If we are to make further advancement along these lines we must be enabled to compare more closely the results obtained at different works In order to do this we should all adopt the same method of keeping accounts, not only in the bookkeeping but in the methods of measuring the quality. If one works tests of the candle power of the gas with a flat flame burner and another with a Sugg's Argand, and still another with an adjustable Sugg's Argand, the actual results may be exactly the same, yet the different methods will show an entirely different quality and our comparisons of results are practically worthless. I hope that some action may be taken at this meeting that will lead to the adoption of a uniform method of measuring the quality of the gas, not only in New England but throughout the country.

A few years ago the American Gas Light Association prepared a uniform system of accounts, at the cost of considerable labor on the part of the committee and the expenditure of quite a sum of money by the Association. A very excellent system of accounts was the result of this work, but I am sorry to say that only comparatively few companies have adopted it. Having been connected for some years with a company which is interested in other works, each having the same system of accounts, I know much good has been accomplished by comparison of results.

The financial stringency of the past year, which, no doubt, has been the cause of the postponement of improvements at many works, followed by the advent of the tungsten and other high efficiency electric lamps, makes the need of more economical manufacture even more essential than ever before. In this connection arises the old question of the value of residuals. Most companies, especially in New England, have a ready sale of coke and ammoniacal liquor, but tar, which should be worth from 50 to 60 cents per ton of coal carbonized, is allowed to go to waste or is sold at a nominal figure.

The advent of the automobile has brought about a new condition as regards the macadam roads. The vehicles moved by the old method of horses had a tendency to roll down the surface of a macadam road and in a measure improve its condition, but the slip of the motor driven wheels of an automobile, together with the suction caused by the rubber tire rapidly leaving the surface of the road,

has the opposite tendency; that is, it tears up the surface of the road rather than rolls it down. We have in Manchester a number of coal tar concrete roads which stand the wear and climate very well. We hear reports of macadam roads coated with coal tar and also a mixture of coal and water gas tar giving very good results.

If there is not a demand for tar it may be burned to good advantage under the boilers or benches. A good demand for coke, and a surplus of tar on hand, may be equalized by using the tar under the benches and selling the coke it would replace.

A bench of 6 retorts 15 inches by 28 inches by 9 feet, with charges of 300 pounds per retort, can be kept at a good working heat with about 130 gallons of coal tar per 24 hours. This bench would use about 56 bushels of coke per 24 hours. The coke can be sold for 11 cents per bushel, which would make the value of the coke used for fuel $6.16, and as this coke is replaced by 130 gallons of tar, the tar is worth 4.73 cents per gallon for fuel. The new use of tar on macadam roads and with the old method of burning it the price should be maintained.

If a gas plant is equipped with modern machinery and appliances and the residuals properly sold, so that no further reduction in cost can be expected in that direction, then the only source to which we can look for help to attain that goal, lower cost, which, like the will-o'-the-wisp, ever moving forward, is to increase the sales.

Nearly all works can produce from 50 per cent. to 100 per cent. more gas without additional outlay for apparatus; but with this extra sendout the cost per 1,000 can be materially reduced as you all know, for there are fixed charges which always remain the same without regard to the amount manufactured.

The best results as regards sales that we have knowledge of is over 7,000 cubic feet per capita per year, and the same company's sales are 36,000 cubic feet per meter per year. You will note most companies fall much below these figures. At 5,000 feet per capita the sales of a majority of plants would be increased materially, which would eventually reduce the cost of manufacture and in turn reduce the selling price.

The question as to how best increase the sales is a serious one, especially in the face of the competition of the new, high efficiency electric lamps. That we have the best and most economical light is not alone going to increase our sales. The commercial or selling end of the business should be organized and given as much prominence as the manufacturing. We have the best light and unequalled fuel for industrial appliances, but having this knowledge and not imparting it to our prospective customers will not make consumers.

The National Commercial Gas Association is doing much to promote the commercial end of our business, and its organizers deserve much credit for what they have accomplished in the short time they have been in existence. The bright, snappy papers read at their December meeting, in Chicago, should be studied by all, as they contain many good ideas.

If, through coming to this meeting you receive any inspiration or enthusiasm to increase your sales, then you will have been well paid for having been here. The indications point to a return of prosperity throughout this country, which means more activity in our business. We erected in Manchester last year two experimental benches of vertical retorts, and no doubt you expect some report of the results obtained. A description and illustration of the setting were made at the meeting of the American Gas Institute in a paper by Mr. J. B. Taussig, of Philadelphia.

The plan adopted was for intermittent charging, and included placing a combustion chamber between the retorts and the furnace, where the gases would mix, and in this way avoid the flame striking the retorts. The recuperators are above the combustion chamber. Two benches were erected, each containing 9 retorts, 8 inches by 14 inches at the top and 12 by 18 inches at the bottom, elliptical in shape, and 18 feet 6 inches long. The small size retorts were adopted in order to carbonize the coal in a shorter time, and in this way make more charges per 24 hours, which would give a larger capacity per day than if longer charges were made. The small retorts did not, however, prove the success that was expected. A charge of 850 pounds of coal per retort was burned off in 6 hours, but it would not discharge without some poking unless left in for a longer period.

The bench was operated for 3 months. Run-of-mine West Virginia coal was used during the greater part of that time, but on a trial of all screened coal it was found the retorts would discharge properly. In order to determine the best size of retort for run-of-mine American coal, it was decided to carry the experiment further, to remove the retorts from the setting and replace them with others of various sizes and tapers.

The new retorts are now being set, and they will have a capacity of 1,000 to 2,200 pounds each, filled within about 3 feet from the top. We expected to be able to give you the results of these further experiments at this meeting, but will have to defer it until some future time. In the tests made the yield and candle power were satisfactory and a very excellent grade of coke was produced. The control of the heats in the bench was perfect, so that all that is to be determined now is the proper size of retort to be used. We feel that the above described test will settle this question. One of our New England cities has recently completed, and has had in operation for several months, a modern retort house. The general plan is the through-retort, and the principal departure from the old lines is a mechanical stoking arrangement in the furnaces, which thus far has proved very successful, and we will no doubt have at this or a future meeting a description of this plant and a statement of the very excellent results they obtain. New England is doing its full share in the development of the manufacturing plant. Summany:

Keep up your interest in all of the Associations; it helps the business.

Look after the sale of residuals.

Adopt the uniform system of accounts.

Make a concerted move for a uniform system of tests.

Push the commercial end of the business.

An object or proposition viewed from different points, or at another time, may not appear the same.

No doubt there are other branches of our business, which some of you may consider more important than those mentioned. I have briefly called your attention to those which at this time seem to me worthy of careful attention. I have mentioned the commercial branch last, not because I think it the least, but because I consider it the most important.

During the year 1908 one of our members has been called from the duties of this life, Mr. W. H. Barnes, General Superintendent of the Bristol Gas and Electric Company, Providence, R. I.

"Somewhere or other there must surely be
The face not seen, the voice not heard."

Vice-President Snow—Gentlemen, we have had an able and practical address delivered to us. A year ago the Association voted to make a change in the manner of considering the President's address. Instead of referring it to a committee for consideration it was voted to discuss the paper in open meeting right after the reading. I hope you gentlemen have found things of interest enough to provoke an animated discussion. I would suggest that some of the Past-Presidents, out of their experience, be called upon to say something. Mr. Lamson, won't you set the ball rolling?

Mr. Lamson—I don't think I am ready to discuss the President's message.

Vice-President Snow—Mr. Nettleton, we would like to hear from you.

Mr. Nettleton—Mr. President, I had forgotten the action which you say was taken by the Association last year, and really I would like to return to the old method. I think most of us, as indicated by the fact that we are all keeping our seats, would prefer not to discuss the President's address. It is always a carefully considered paper, none of us have seen it before, it is original, and to get up and either commend the statements or differ with them I dislike to do. I would like to say, while on my feet, that I enjoyed listening to the address very much indeed. It is a very important one, and I think it is one that will well repay the re-reading. I would like to move, Mr. President, if I may, that it be referred to a committee in the usual course that has been followed for several years past.

Col. Richardson—I second that motion.

Vice-President Snow—Gentlemen, you hear the motion. Are there any more remarks on the question? Are you ready for the question? All those in favor of having the President's address referred to a committee will say "Aye," those opposed, "No." As the Chair gets it the ayes have it. The Chair will appoint Mr. Nettleton, Colonel Richardson and Mr. Prichard.

(To be Continued.)

President Hibbs, of the Elmer (N. J.) Gas Company, is arranging for a great plat of main extensions. The main division in the installation will be that which hooks Elmer up to the Borough of Moostown.

SECOND ANNUAL CONVENTION, INDIANA GAS ASSOCIATION.

HELD AT CLAYPOOL HOTEL, INDIANAPOLIS, IND., JAN. 20TH AND 21ST, 1909.

FIRST DAY—MORNING SESSION.

WELCOMED BY MAYOR BOOKWALTER.

The President convened the Association at 10 A.M., the morning of January 20th, and said: I have the pleasure this morning of introducing to you the Hon. Charles A. Bookwalter, Mayor of Indianapolis, who has kindly and very graciously come to our meeting for the purpose of welcoming us to the city of which he is the Chief Executive.

The Mayor—Mr. President and Gentlemen of the Convention: I presume I ought to be able to talk to you most entertainingly this morning, if not instructively, because I know practically nothing about the business in which you are engaged [laughter] and naturally knowing nothing about the business, there are no limitations upon what I might feel called upon to say. But I am going to save myself, and you at the same time, by practically saying nothing about the gas question. You are here to talk that subject over amongst yourselves, and from what I read in the newspapers, while out in Kansas during the past week, you can undoubtedly have enough to talk about while you are here and enough to think about when you get home, if things that are now impending should come to pass. But you are in Indianapolis, just as naturally as other conventions have been in Indianapolis, because it is towards the middle of the State, and it is practically the center of gravity of Hoosiers, especially when they wish to get together and discuss subjects wholly in the interest of the consumers of the products which they are engaged in manufacturing.

Indianapolis, of course, has become accustomed to having the Chief Executive come before conventions and in formal words assure each one in turn that they are the most intelligent body of men he has ever faced, and that they fully represent the highest type of Hoosier life, and also expect him to say to them that while in Indianapolis they are welcome. It has always seemed to me that the latter part, if not all, of the formal speech of welcome is unnecessary. You know that you are the best representatives of the business in Indiana. You know that you are most intelligent men, engaged in the business in Indiana, and it is not necessary then to be told it by someone else, and we know, and you should know as Hoosiers, that you are welcome; but it has become the custom to perform this duty to each new convention that comes. I am here to-day a willing sacrifice again to do my duty towards making these convention proceedings absolutely formal and correct in so far as the record is concerned. We welcome you here in Indianapolis as men who represent a great industry in our State. It seemed some 25 years ago as though we could easily dispense with you and your enterprises. In this central portion of Indiana all we had to do was to stick a hole in the ground and old Nature became a competitor against whom you could not fight. But with the weakness of the American to spend lavishly that which he has, and, like the Indian, think but little of the future, we proceeded to make merry with the wealth that we had found. Indiana looked like one perennial torchlight procession—flambeaux at the barn, flambeaux at the well, flambeaux at the front door and flambeaux at the back door. The furnace in the cellar ran 24 hours, and when the heat became a little too oppressive inside we did not bother to go down to the cellar and turn it off; we just threw up the windows and opened the doors. They say it is an ill wind that blows nobody good. Well, the wind that blew out the natural gas certainly blew the gas industry, the manufacturing end of it, some good, although it blew away from us the greatest blessing that the people of Indiana ever had. So now we have come back to look upon the gas man again as a necessity. The gas man is always a good friend to the consumer, except from the 1st to the 10th of the month [laughter], and then he is an enemy. The gas is a welcome visitor in the home; just as welcome as the bill is unwelcome; and with that sacrificing spirit which was best exemplified by Josh Billings' patriotic declaration that the unholy rebellion should be suppressed even if it took all his wife's relations, your consumers are perfectly willing to pay the cheapest price for gas even though it breaks the owner. [Laughter.] Such is a condition that confronts everybody in Indiana. I presume it would be much more popular, and I know it would be much more demagogical, for me to stand on the proposition that you ought to furnish the product that you produce for nothing rather than at a living rate; but I have never courted the mob nor its opinion in that respect, and have always stood firmly by the proposition that in your business you are entitled, like I am in my business, to a living profit. [Applause.] What that living profit may be people differ upon; but it does occur to me that the time has about come for the thinking, reasoning, reasonable people to ask themselves the question whether they have not gone just a trifle too far in the crusade that has been started, not only in Indiana but in every other State in this Union, against a living profit to public utility corporations. [Applause.] I never asked for one, I never expect to ask for one, I never got a dollar of their money honestly, and I never got a dollar of their money in any other way, and I appreciate the fact that, because I felt my official duty compelled me to do my full duty by all the people, that I may at times have been placed in positions that appeared to be antagonistic to the interests of some elements of the community; but I have always had the courage of my convictions, and as an official I never try to do to another's business what I would not be perfectly willing that that man should do to my business, and on that rule I will stand and I will fall.

But you are welcome to Indianapolis. Hoosiers are always welcome. This city has been made up in its better elements of people from the outside counties of Indiana. Why, I came from an outside county myself. [Laughter.] You take the census of this Capital City and I believe I am warranted in making the statement that practically 80 per cent. of the people residing within the limits of Indianapolis are Hoosier born. That is true because, naturally, people have gravitated toward the center of population of the State and toward the political center of the State, and hence, being made up, as we are, of men from the outside counties of Indiana, we naturally feel like welcoming at all times those of our fellow Hoosiers who as yet have not had the extreme good taste to move here permanently. [Applause.]

I am not going to present to this convention the keys of this town. I do not believe in locking up things that you are not ashamed to show, so we keep it unlocked all the time; not in the mean sense, not in the sense that the term "wide open" is naturally understood, because Indianapolis is a clean, wholesome, moral city, and it is a physically clean city as well. But in the better sense I say to you that the gates of the town are open, the doors of the town are open, the hearts of the people are open, and the best we have on tap in the way of a Hoosier welcome is certainly yours. I thank you. [Applause.]

THE PRESIDENT'S RESPONSE.

The President—Gentlemen, I am sure you have, by your applause, voiced your sentiments in reference to the courtesy manifested on the part of his Honor, the Mayor, in coming here to bid you welcome, better than any words I could express. I am sure it is with feelings of gladness and joy that we recognize, in the Executive of the city of Indianapolis, a man who in his heart appreciates the rights of public utility corporations in so far that fair treatment should be accorded them. We are thankful to him for his kind words of welcome to this metropolis of the State, a city that has many attractive features, a city, as he says, that is clean in growth and clean so far as the city itself is concerned, one whose attractiveness is everywhere recognized; and such a city necessarily boasts an attractive lot of people, and I am sure that all of you will join me in congratulating Indianapolis in having so representative a Mayor as his Honor, Charles A. Bookwalter. [Applause.] I am not acquainted with the politics of the city of Indianapolis, yet it is with pleasure that I remember of casually reading in the newspapers that Mr. Bookwalter has been Mayor of this city for quite a number of years, and I trust that he may be preserved and that his vigor may be retained, so that in the future he may give to his city and his State a continued period of his valued services. Mayor Bookwalter, I sincerely thank you for the courtesy and honor you have extended to us this day. [Applause.]

The Mayor—I am willing to be preserved, but not as Mayor.

SOME ROUTINE.

The President—The question of entertainment for to-night was brought before the Executive Committee yesterday, and Mr. Eves, our Secretary, has conferred with the *chef* of the hotel in reference to a dinner to-night. It is his idea to obtain from you your sentiment as to whether or not you wish to spend this evening as individual members of the Association assembled collectively. As Mr. Eves is acquainted with the detail, I will now call upon him to acquaint you with it.

Mr. Eves—Gentlemen, we could not decide as to whether we should provide anything in the way of entertainment or not. The matter,

however, was referred to the Executive Committee yesterday at its meeting, and it was then decided that we should place the matter in your hands this morning, in time to notify the management in case we should decide to have a little informal dinner at about 6 o'clock this evening. Is that your wish? Or would you prefer to be at your own disposal this evening? I have two very interesting bills of fare at $2 each, and I think we could have a very pleasant, social evening together. This would give us the most time to talk about our business in a pleasant and social manner. Those in favor of that idea will kindly indicate it by rising. [Counting.] We are very much obliged, gentlemen. We have decided not to have the informal dinner.

ROLL CALL.

The President—Gentlemen, the first thing on the programme is roll call and election of new members. We have decided to postpone the election of new members until to-morrow. In the meantime, as to the applications that have been made, let the applicants consider themselves entitled to all the privileges of the Association.

The Secretary—Gentlemen, I will now call the roll of the Association, as follows:

Active Members.

Atkinson, G. G., Goshen.
Barnes, A., Columbus.
Beers, D., Fort Wayne.
Blank, C., Martinsville.
Carroll, J. A., Logansport.
Case, H. M., Connersville.
Dales, J. S., Franklin.
Davis, A. B., Indianapolis.
Dolley, G. M., Peru.
Dunbar, J. W., New Albany.
Dykeman, J., Evansville.
Eves, P., Indianapolis.
Fox, C. W., Michigan City.
Frazee, W. M., Rushville.
Gaddis, G. M., Shelbyville.
Graf, C. H., Indianapolis.
Hayden, H. D., Valparaiso.
Kellar, C. M., Columbus.
Kelso, C. B., New Albany.
Kunz, G., Lawrenceburg.
Loomis, F. M., Indianapolis.
McDonald, W. B., Evansville.
Miller, C., Indianapolis.
Miller, J. H., Princeton.
Moncrieff, J. M., Bloomington.
Mulholland, S. E., Fort Wayne.
Olsen, E., Indianapolis.
Ott, J. M., Rochester.
Perkins, J. A., Richmond.
Pickens, A. G., South Bend.
Ridenour, O., Peru.
Rochat, H., Indianapolis.
Rowland, S. C., Crawfordsville.
Schutt, H. S., Michigan City.
Stundard, O. J., Brazil.
Thwing, O. O., Fort Wayne.
Wakeman, E. A., Terre Haute.
Wallace, W., Lafayette.
Walters, B. S., South Bend.

Associate Members.

Brown, T. R., Terre Haute.
Cunningham, J. R., Toledo.
Draper, C. E., Sullivan.
Fritch, C. H., St. Louis.
Harper, H. D., Chicago.
Kellum, B. J., Chicago.
King, J. E., Chicago.
McNabb, A., Indianapolis.
Parker, J. F., Rockford, Ills.

The President—Next on our programme is the minutes of our meeting. In these minutes are contained the constitution and certain record routine matter in reference to our meetings. I don't know that they will be of any particular interest to you. You have already read the copy of the constitution and by-laws and inasmuch as the records of the various meetings are incorporated in the report of the Executive Committee, I would entertain a motion that the reading of the minutes be dispensed with. [Seconded by Mr. Graf.]

The President put the question and declared it carried.

REPORT OF EXECUTIVE COMMITTEE.

The President—The next item on the programme is the report of the Executive Committee, by Mr. Eves.

This was read by Mr. Eves, as follows:

The constitution and by-laws provide that a report shall be presented by the Executive Committee at each annual meeting.

Since the first general meeting of the Association, held in Indianapolis, March 27th, 1908, this Committee has met on three occasions. At the meeting held September 11, 1908, our first Secretary, Mr. F. K. Lane, tendered his resignation, and as he had assumed other duties necessitating his absence from the State, the resignation was regretfully accepted. This Committee, in accordance with the provisions of the by-laws, at once appointed Mr. Lane's successor, and directed Philmer Eves, of Indianapolis, to fulfil the duties of the office of Secretary-Treasurer during the unexpired term.

The subjects which the Committee considered to be of timely interest for discussion at this annual meeting were selected and arrangements were made for the preparation of the necessary papers by those members of the general Association competent to deal with the topics chosen. The response by the members who have accordingly prepared the papers was most willing and pleasing, and the Committee has thus been able to secure a fairly comprehensive programme.

At a subsequent meeting, held in Indianapolis, December 16, 1908, the following members were appointed the Nominating Committee, namely: O. O. Thwing, G. M. Dolley, G. G. Atkinson, H. S. Schutt and S. E. Mulholland.

The applications for membership, received since the last general meeting, have been approved for submission to the Association at this annual meeting.

The Executive Committee, as well as every member of the Association, hopes that those officials who are connected with any of the Indiana gas companies not yet represented on our membership list, will consider it their duty, as well as privilege, to join the Association and to take an active interest in its work for the common good of the gas business of the State.

The question of printing in pamphlet or book form the Proceedings of the Association is considered worthy of consideration at one of the sessions of this convention.

The question of amending the Constitution so as to provide for the election, at each annual meeting, of 2 directors, to serve for 3 years, in substitution for clause 17, which provides for the election of 6 directors for a 3 years term, was considered to be an important one for discussion and action at this meeting.

The Association has started with initial promise and encouraging success, and with the individual and combined support of the membership, there is every reason for anticipating that the Indiana Gas Association will prove as active and useful as any State Association previously organized.

This Committee desires to record its appreciation of the graceful compliment paid to this Association, by the action of the Hon. C. A. Bookwalter, Mayor of Indianapolis, in opening its Second Annual Meeting. [Signed.] JAS. W. DUNBAR, President,
W. B. MCDONALD, Vice-President,
S. T. MURDOCK,
C. H. GRAF,
B. S. WALTERS,
C. H. GEIST,
E. A. WAKEMAN,
S. C. ROWLAND,
} Directors.
PHILMER EVES, Secretary-Treasurer.

The President—Gentlemen, you have heard the report of the Executive Committee and the recommendations contained therein. What is your pleasure?

On motion of Mr. Graf, seconded by Mr. Rowland, the report was accepted and ordered filed as read.

Mr. Eves then submitted the

REPORT OF THE SECRETARY-TREASURER.

INDIANAPOLIS, January 20, 1909.

Membership.

Active members to June 27th, 1908 (charter members)		49
Associate " " " " " " "		11
		60
New members (active)	9	
" " (associate)	2	— 11
		— 71

Cash Statement.

Receipts—

Dues for 1908, 53 members paid	$265.00	
Interest	1.30	
		$266.30

Expenditures—

On all accounts in itemized statement	$60.35	
		$266.30

Audited and found correct, S. C. ROWLAND, E. A. WAKEMAN, F. M. LOOMIS, } Auditing Committee.

HISTORY OF THE ASSOCIATION.

The Secretary then read the following interesting paragraphs:

The Indiana Gas Association was born at 11 A.M., January 16, 1908, when a preliminary meeting was held in Indianapolis. The pioneers who attended this meeting were: Messrs. S. T. Murdock, Lafayette; Jas. W. Dunbar, New Albany; Carl H. Graf, Indianapolis; S. C. Rowland, Crawfordsville; W. H. Thomas, Auburn; and F. K. Lane, Richmond.

The purposes of the Association were discussed, and it was decided to call a general meeting of those interested in the "promotion and advancement of knowledge, scientific and practical, in all matters relating to the construction and management of gas works and the manufacture, distribution and consumption of gas."

The general meeting, which has now gone on record as the "first

annual meeting," was held in Indianapolis, March 27. 1908, with Mr. S. T. Murdock in the Chair. The draft of the constitution and by-laws, which had been very carefully compiled, was submitted, and, after a few minor changes, was unanimously adopted. The officers elected for the ensuing year were:

President—Jas. W. Dunbar, New Albany.
Vice-President—W. B. McDonald, Evansville.
Secretary-Treasurer—F. K. Lane, Richmond.
Directors—S. T. Murdock, C. H. Graf, B. S. Walters, C. H. Geist, E. A. Wakeman, S. C. Rowland.

After a very pleasant and profitable meeting, the members present were invited by Mr. Carl Graf to visit the plant of the Indianapolis Gas Company. Those who were able to do so accepted the invitation and evidently enjoyed what they saw, a special car being chartered by Mr. Graf to convey the party to and from the works.

On September 11, 1908, Mr. F. K. Lane was unfortunately obliged to resign the office of Secretary Treasurer, to the sincere regret of the officers and members of the Association. The writer had the honor to be elected Secretary-Treasurer to fulfil the duties of the office during the unexpired term and at once notified all the members of the official change.

It is the desire and aim of the officers and members to make the Indiana Gas Association a recognized and respected organization throughout the State, and an official and powerful means of bringing the gas industries of the State into a closer relationship for mutual helpfulness and for the good of all. The Association will also be considered a medium through which the goodwill and co-operation of the public of the cities and towns of Indiana may be recognized and deservedly retained. To this end, each member of the Association will consider it his duty and pleasure to contribute at these meetings the benefit of his experience and hearty assistance, so that, by individual effort and united action, our respective gas plants and the various distributing departments may be brought to the highest standard of efficiency and public acceptability.

There are a few gas companies of Indiana that are not yet represented in this State Association. It is hoped the managers and superintendents of these companies will see the advisability of giving to the Association their individual or representative support.

It is gratifying to know that such important and excellent publications as the American Gas Light Journal, "Light," and "Progressive Age," have already signified their intention to give space and publicity to the proceedings of the Indiana Gas Association.

This Association would take the present opportunity to congratulate the National Commercial Gas Association, and the American Gas Institute, on the unparalleled success of the great Convention and Exhibit held in Chicago last December. The gas companies, as well as the gas appliance manufacturers everywhere, are fully conscious of the far-reaching benefits that have accrued to the gas and allied industries of the country by means of the educational facilities of that memorable occasion. Philmer Eves, Secretary-Treasurer.

On motion of Mr. Graf (seconded) the reports were accepted and ordered filed as read.

The President having called for reports from special committees without response, President Dunbar read his

INAUGURAL ADDRESS.

[For the text of the Address, see Journal, Feb. 1, 1909, p. 179.]

On motion of Mr. Graf, a Committee of three was ordered appointed to consider the President's address and report thereon at to-morrow's session, with any recommendations deemed fitting.

(To be Continued.)

[Prepared for the Journal.]

Electrical Measurement of Gas Temperatures.

By Mr. Chas. E. Foster.

Every gas engineer knows that temperature measurements are vital to the proper treatment of gas. After its generation by carbonization it requires careful handling to get the maximum candle power combined with good yield of by-products. Below is a list of the most important points requiring accurate temperature measurement, although it is by no means exhaustive:

(1.) Reduction of gas temperature, gradually and without shock.
(2.) Tar extraction by condensation.
(3.) Tar extraction by mechanical means.
(4.) Ammonia extraction.

The proper control of the temperatures under which these operations are carried on is complicated by variations in

(1.) The rate of flow of the gas.
(2.) The atmospheric temperature.
(3.) The temperature of the cooling water.

If some one person could be given the power to see the temperatures at all various points "at a glance," and if that one person were put in control of the temperature regulation, then the proper conditions would have been established to get the best efficiency. There would be unity of purpose and consequently a more intelligent scheme of control.

The resistance thermometer offers a convenient means of bringing all temperature readings to the central point of control. By a suitable installation of resistance thermometers the temperatures at points widely separated, and perhaps difficult of access, may all be read in quick succession at one central station. An alteration may be ordered in one part of a plant and its effect upon the other temperatures studied immediately without the necessity of a tour of inspection.

The construction and working of the resistance thermometer are extremely simple. The sensitive part of the instrument consists of a coil of platinum wire, suitably protected. Fig. 1 shows this coil, at *D*.

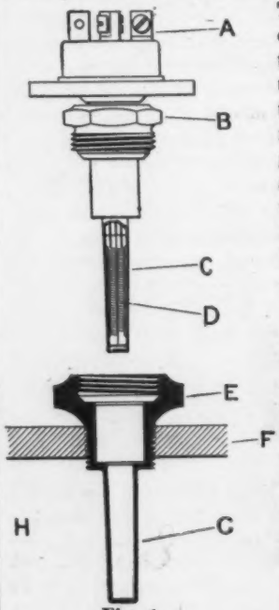


Fig. 1.

The coil of wire, called the "bulb," because it acts like the bulb of a mercury thermometer, takes up the temperature to be measured. Then, with a rise in temperature, instead of an expansion of mercury read in a graduated tube, we get an increase in the electrical resistance of the platinum wire. To measure this increase in resistance a device is used known as a Whipple indicator, and the method may be likened to a system of electrical weighing.

In a chemical balance an unknown substance is weighed by opposing it with known weights, until we get a balance, as indicated by the pointer of the balance remaining central. In the same way the Whipple indicator measures the electrical resistance of the "bulb" by opposing it with another resistance, and the balance is indicated by the pointer of a detector remaining central. In actual practice the operator has no need to consider resistance at all, as the indicator is scaled so as to read temperature direct without any corrections. All he has to do is to turn a handle until the detector indicates a balance, when the required temperature is found on the scale opposite a fixed

Fig. 2.

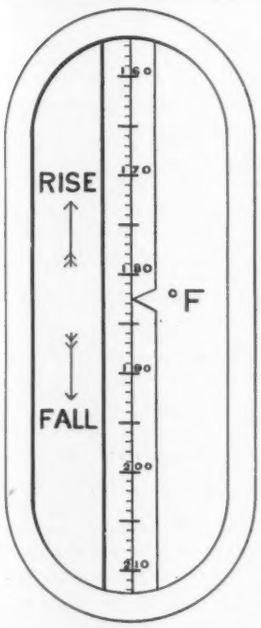


Fig. 3.

pointer. The scale of the indicator, as seen in the instrument, is shown in Fig. 3. The general appearance of the instrument is seen in Fig. 2, where it is shown connected by flexible cable to a resistance thermometer. The whole instrument is compact, and contains batteries and detector in the same case. Usually an installation will include several resistance thermometers, installed at various important points, beginning, say, in the hydraulic main and finishing at the water seals of the gasholders. Each thermometer will be connected by a cable to a plugboard at the central station. Fig. 4 shows this device. The plugboard is provided with a contact plug and flexible cable. The other end of the flexible cable is joined to the Whipple indicator. Thus, to read all the temperatures, the operator has only to push the plug in succession on to each of the contact blocks, reading the temperature on the scale of the indicator. The scale is a very open one (see Fig. 3), and any temperature from 0 to 1,200° F. can be read to ½°. The connecting cables are multi-conductor, and are arranged so that the actual electrical resistance of the cables themselves does not come into the measurement. This is similar to the principle whereby the actual weights of the scale pans in a chemical balance do not affect the weighing. For this reason the readings with resistance thermometers are quite independent of the distance between the "bulb" and the indicator. It makes no difference if one bulb is 1,000 feet away while another is only 10 feet distance, the readings will be equally accurate in each case.

Fig. 4.

It will be readily understood that the resistance thermometer can be made in a variety of forms for different purposes. One of the most generally convenient is that shown in Fig. 1. In this type a device is used known as a separable socket. The socket *E* is screwed into the shell or pipe wall, *F*, so that the lower portion, *G*, projects into the space, *H*, of which the temperature is to be measured. The socket has a hexagon head, *E*, for screwing home into the shell. The resistance thermometer terminates in a taper bulb chamber, *C*, machined to give an accurate fit to the socket, *G*. The bulb chamber *C* is forced into close contact with *G* by the union nut *B*, the same nut also serving to withdraw the thermometer when desired. The connecting cable is attached to the binding posts.

Fig. 5.

The great advantage of the separate socket is that, while it gives accurate readings, the thermometer maybe withdrawn without shutting down the pipe line in which it is inserted. Fig. 5 shows a pattern used for air temperatures.

In addition to the readings made with the indicator and recorded on a suitable sheet, continuous automatic records may be made.

Prof. H. L. Callendar designed a recorder which performs automatically the same balancing operations as are done by hand with the Whipple indicator.

This recorder continually balances the resistance of the thermometer bulb and draws a record in ink of the changes. Thus, by means of a extra contact plug, a Callendar recorder (see Fig. 6) will make a record of any one of the temperatures.

The Resistance Thermometer and its accessories form part of the extensive line of "Taylor-Cambridge" instruments manufactured by the Taylor Instrument Companies, of Rochester, N. Y.

Fig. 6.

Bureau of Information, The American Gas Institute.

Under the direction of the Institute it has been decreed: 1. That the privilege of submitting questions be limited to members of the Institute. 2. Neither the Board of Directors of this Institute, nor the Institute as a body, make themselves in any way responsible for the statements of fact or expressions of view given out by the Bureau of Information.

BUREAU OF INFORMATION,
THE AMERICAN GAS INSTITUTE,
HEADQUARTERS, 716 LOCUST STREET, ST. LOUIS, MO.
W. A. BAEHR, Chairman.

ADDENDUM TO QUESTION NO. 48, FEB. 25, 1909.

The Bureau of Information wishes to submit a resume of the meter shop practice of various gas companies as an addendum to its answer to question No. 48, which question reads as follows:

"What are the comparative merits, in the case of large companies, of making meter repairs under a 'piecework schedule' as compared with strictly 'day work?'"

This *resume* consists of a letter from each company, which letters are as below:

ST. PAUL (MINN.) GAS LIGHT COMPANY.

Replying to your inquiry of the 5th inst., as follows:

Meters passed through shop:

	1906	1907	1908
Year			
Number	6,762	5,961	8,926

Employees of shop: One foreman; 1 meter repairer; 2 apprentices.

We pay all our employees by the hour, but make a check on each class of work similar to a piecework system. Each man shown distributes his time on his daily card to show number of hours and number of meters tapped, oiled, back plates removed, valves ground, meters tested, adjusted, etc. This has proven the most satisfactory method for us, our shop force being too small for a piecework system.

Very truly, B. F. PELTON, Supt. Dist. Dept.

THE PEOPLES GAS LIGHT AND COKE COMPANY, CHICAGO, ILLS.

Your letter, to Mr. E. G. Cowdery of this Company, has been handed to me for reply. During the past year we handled, through our meter shops, approximately 85,000 meters. Our present practice is to employ men on an hour basis, ranging from 15 cents to 30 cents per hour, 10 hours per day. We endeavor to fix and increase his hour rate in keeping with his recognized ability.

The same arguments for and against either daywork or piecework in any shop work are applicable, in my opinion, to meter shop practice. New York uses the piece rate; Philadelphia a premium plan; Baltimore a combination, which is practically a piece rate. I favor paying *bench hands*, where their work each day is practically a repetition of the previous day's work, in such a way that there will be a *natural* and *constant* endeavor on the part of a man to do as much as he is *capable* of doing each day, independent of what his weaker or stronger fellow employee may do, or what he himself may have formerly done. So much per day does not contain the necessary incentive. On the other hand, the determination of proper piece rates is difficult and entails system, etc., so much so that I would not advise its introduction in small shops. We are now arranging our work in

such a way that, should it seem feasible after further investigation, we can adopt a premium or bonus plan, equitable to our employees as well as ourselves. Very truly yours,

CHAS. C. SCHILLER, Sup't of Meters.

SAN FRANCISCO (CAL.) GAS AND ELECTRIC COMPANY.

In answer to your letter of Feb. 5th I wish to state as follows: We run our meter shop on a day-work basis, with a standard of minimum output per man, and find, with a good foreman who thoroughly understands the work, that it proves very satisfactory, and, I believe, superior to piecework. We have ascertained the time required for each separate operation, and a cause must be shown when the time is overrun. The number of meters passed through our shop during 1908 was 25,233; 22,883 being repairs, and 2,350 repairs and renewals of diaphragms. There were 18 men employed; counting 300 working days at 8 hours per day, this will show an average of 1 hour and 45 minutes spent in repairing each meter. Very truly yours, E. C. JONES.

INDIANAPOLIS (IND.) GAS COMPANY.

Replying to yours of the 5th, we beg to advise that, during the year 1908, 14,472 meters passed through our meter repair shop. Our force of men in this shop during the year consisted of 1 foreman, 3 repair men, 1 tinner and 1 boy. All work was done by day work. We have always felt that, in the piecework schedule, we would not get satisfactory results without having thorough inspection by a competent inspector, and do not believe that there would be any advantage to us in making a change at the present time.

Yours very truly, CARL H. GRAF, Gen. Manager.

BUFFALO (N. Y.) GAS COMPANY.

We repair all our meters by day work, and as I have never had any experience with piecework, I am unable to give an opinion as to the comparative value of the two systems. In either case the method of management is a very large factor. Very truly yours,

H. C. PALMER, Engineer.

CENTRAL UNION GAS COMPANY, NEW YORK.

In answer to the questions asked, I beg to say that our meter shop repaired 25,575 meters of the various sizes in 1908. All this work was done by piecework, and believe it to be the most satisfactory method of handling it. Yours very truly,

A. H. HALL, Asst. Secretary.

TRI-STATE GAS COMPANY, STEUBENVILLE, O. (Branch Office).

Your favor of the 5th, to Mr. H. B. Beatty, President of the Manufacturers Light and Heat Company, was handed to me. In reply would state that I do not believe it would be to the best interests of the Gas Company to have their meter repairing done by piecework, as an employee a little negligent, or hurrying up, might do work that would be very expensive for the gas company. I believe a good employee will do better work and be more particular on a day or monthly salary. We cannot give you the number of meters passing through our shop per year, as, prior to this year, the party repairing the meters was on other work which was not kept separate from the time put on the meters. Some meters will cost us 25 cents, while others, where we have to put in new diaphragms, would be from $1.50 to $2; and, again, where a meter has passed through fire, the cost probably would be $4. I remain, yours very truly, E. C. BEATTY, Superintendent.

WESTCHESTER LIGHTING COMPANY, MOUNT VERNON, N. Y.

In answer to the American Gas Institute, Bureau of Information, Question No. 48, in your letter of February 5, would say as follows: Number of meters repaired W. L. Co., all meters repair work done at Central Union Shop:

	Reg.		P.P.		
Lt.	Dia.	C. & O.	Dia.	C & O.	Cover Arms.
3.....	723	87	238	86	50
5.....	822	154	444	288	69
10	151	29	7	4	25
20.....	27	3	0	0	1
30.....	3	2	0	0	0
45.....	4	1	0	0	1
60.....	3	0	0	0	1
100.....	3	0	0	0	0
150.....	1	0	0	0	0

I called up Mr. Hall, who is Superintendent for the Central Union Gas Company, and asked his opinion as to shop work. He said that all other meter shop work was piecework, and his opinion was that it was the best system. Hope this gives you all the information requested in your letter of the above named date.

Yours truly, G. T. MACBETH, E.G.D.

MILWAUKEE (WIS.) GAS LIGHT COMPANY.

I have your inquiry of February 5th, and would say that we pass through our shops upwards of 35,000 to 40,000 meters per year. All work is day work. As regards the advantages of this method, I can only say that we have been trying hard for several years to get our meters into the best possible condition, and a recent comparison of the average of a large number of meters taken from the test records of 5 of the largest companies in this country, and classified under the term for which the meter has been in use, shows our meters to be in good condition, if not a little better than any of the others. For the small saving to be effected I would not under present conditions want to change to a piecework basis, though undoubtedly, if properly systematized and safeguarded by check inspection, in a large shop considerable economies could be shown by that system.

Yours truly, R. B. BROWN, Engineer.

THE MUTUAL GAS LIGHT COMPANY, NEW YORK CITY.

Replying to your favor of February 5th, regarding the question of meter repairs, I beg to say we are repairing 1,500 meters per month, and everything is piecework up to 30 lights; above that is day's work. We make our diaphragms and consider piecework more satisfactory than day's work, especially where we have so much of it to do. We get a good many good parts from the old, condemned meters for repairs, and find a sale for all meters condemned at a small price, and do not find it necessary to condemn nearly as many as when sent to an outside factory for repairs. Yours very truly,

WALTER A. ALLEN, Eng'r. and Sup't.

LOS ANGELES (CAL.) GAS AND ELECTRIC COMPANY.

Replying to your favor of the 5th inst., below I give you answers to questions in the order asked. Number of meters passed through shops during year, 24,934. All of our men are paid by the month. There is not enough of any particular branch of the work to adopt a piecework system. Furthermore, practically all of our work is general repairs, and a certain amount of work is often required before it is determined just what will be necessary in the way of repairs, consequently men are employed who are fitted for general repair work. Trusting this will be satisfactory, I am, yours respectfully,

C. S. VANCE, Manager of Operation.

LOUISVILLE (KY.) GAS COMPANY.

Replying to your inquiry of the 5th inst., the number of meters passing through our repair department, including all meters brought in for test last year, was about 16,000. We have never considered the advisability of piecework. Respectfully, A. H. BARRET, Engineer.

MINNEAPOLIS (MINN.) GAS LIGHT COMPANY.

Yours of Feby. 5, received and contents noted. Will say, in reply, that I do not think piecework, in a meter repair shop, for large companies, would be satisfactory, as the number of meters the company has to repair does not come regularly enough; at least, that would be the trouble in Minneapolis. While we handle all of our meters every 3 years, during the period of changing we are very busy. After that period, which only lasts about 3 months, we are then running along on regular moves and sets and general repairs, which does not keep a very large force at work. From practical experience myself in piecework in the mechanical lines, I believe that it leads all mechanics to slight their work in order to turn off a greater volume. Of course, a man doing one thing all the time becomes very expert at it; but he also learns very quickly to deceive his foreman and get work passed that is not absolutely right. It is human nature that, when you have a stint on any class of work, to make just as much money as possible out of it, and they will cut the corners in every conceivable manner. The great trouble, in my judgment, with the majority of meter shops in large companies, is in the fact that they have a foreman in charge who is a dead man, only looking for Saturday night and pay-day, and to run the shop and keep a number of men along with him who will cause as little inconvenience to his own personal welfare as possible. This was the difficulty I experienced in Minneapolis, and, in order to overcome it, I had to take an absolutely green man and break him into our shop methods and then give him charge of the shop. I think he has made a decided success, so far as we are concerned. The meter is something that we cannot afford to fool with, or to have repaired and go out to its work without being absolutely correct, as we receive plenty of criticism from the very best possible methods known. During the year 1908, we passed 32,508 meters through our shop with a little handful of men. The cost of handling these meters is very small. Very truly yours, F. C. SHEPARD, Superintendent.

Items of Interest

FROM VARIOUS LOCALITIES.

MANAGER JOHN HERYFORD, of the Colusa (Cal.) branch of the Pacific Gas and Electric Company, has been notified that a new gasholder, up to containing 25,000 cubic feet, will be put in for him this season. The existing small pot (we believe it is up to retaining 10,000 cubic feet) has been a constant source of worry to the Colusa operator, who many and many a time was between the devil and the deep sea in his attempt at preventing it from grounding.

WE are informed that, on the afternoon of the 16th ult., the properties of the Lincoln Traction Company, and of the Citizens Railway Company, both of Lincoln, Neb., were joined in an amalgamation, the scheme of which has been under consideration for some months. The concern is to be known as the Lincoln Traction Company, and the capitalization is arranged according to the following schedule: Bonds, $1,500,000; preferred stock, $100,000; common stock, $5,000,000. The officers are: President, John W. McDonald; Manager, J. H. Humpe.

MR. W. B. FOSHAY'S term, as Manager of the Fort Dodge (Ia.) Light and Power Comany, came to an end the 1st inst. His successor is Mr. F. R. Parker. Mr. Foshay was well liked by the people of Fort Dodge, for the local leading paper, in its issue for the 23d inst., printed at length a score of letters from some of the most prominent residents of the city. The testimonials were certainly of the positive sort.

MR. ISAAC CRAWFORD, of 11 South 12th street, Newark, N. J., is the oldest employee of the gas division of the business of the Public Service Corporation of New Jersey. He attained his 45th year of service in Public Service Corporation and its predecessors, the 1st inst., and one to look him over would never think that his entrance to the world was made September 14, 1841. When he took service with Newark Gas Company the late William S. Faitoute was President. He was the 35th applicant for the position that was open, but having been wounded in the Civil War, preference was shown, and he thus gained the position. During his connection with the Company, it was known respectively as the Newark Gas Company, the Consolidated Gas Company, afterwards the Essex and Hudson Gas Company, and now the Public Service Corporation. For 25 years Mr. Crawford held the position of Cashier to the old Newark Gas Light Company under James P. Dusenberry, then Secretary and Treasurer, and that prince of men, the late Eugene Vanderpool, who was President. He has seen many changes in the directorate of the Companies. The oldest Director now living is Colonel Edward H. Wright, while second to him is former Governor Franklin Murphy. Mr. Crawford now holds a position in the Registrar's Department of the Public Service. Mr. Crawford was born in this city September 14, 1841, and was a son of Aaron Crawford, who for a number of years was engaged in tool business in Mechanic street. He was educated in the school of Nathan Hedges, and the old Second Ward Public School, on Market street. When the Civil War started he enlisted in the Thirteenth Regiment, New Jersey Volunteers, and was engaged in several important battles of the conflict. He was shot through the lung at the battle of Antietam. He is a member of Lincoln Post No. 11, G. A. R., and is also past president of the Thirteenth Regiment Veterans' Association and a member of Northern Lodge No. 25, F. and A. M. Mr. Crawford has been a member of the Masonic order for 32 years.—DAVIS."

MR. JOHN LUNSDEN, Superintendent of the Logan (O.) Gas Company since 1902, at its Freemont branch, has resigned.

TRUE to their anti pledges the proprietors of the Western Gas Construction Company, at Fort Wayne, Ind., have started on a 10-hour schedule, with at least 60 per cent. of the normal working force on the payrolls.

THE Ware Gas Light Company, the formation of which was made late in 1907, and which was really nothing more than a subsidiary concern controlled by the Otis Company, of Ware, has petitioned the Superior Court for permission to dissolve, as a going corporation.

THE following is the text of a bill that is now before the Maine Legislature:

"SECTION 1. No corporation, company, firm or persons manufacturing, selling, supplying or distributing gas for illuminating or for fuel purposes, shall charge, exact, demand or collect directly or indirectly from any consumer thereof, any sum or sums for use or rent of meter, or for a service charge or any sum over and above the rate charged for gas itself.

"SEC. 2. Any company, corporation, firm or person that violates the provisions of the preceding section shall be punished by fine not exceeding $100 for each offense."

THE Brooklyn Union Gas Company has notified its shareholders that the 6 per cent. convertible debentures of the Company, that matured Monday last, will be exchanged for shares of the stock at par, if properly presented to the Guaranty Trust Company, of New York.

THE annual reports submitted by the officers of the Chattanooga (Tenn.) Gas Company to the proprietors, Messrs. Child, Hulswit & Co., showed that a most liberal expenditure on plant rebuilding and extending was made in the twelvemonth. The betterments included the placing of a gasholder up to retaining 1,000,000 cubic feet. No change was made in the personnel of the management of the Company.

IT is being arranged for that the Anaheim (Cal.) Gas Company will supply gas to the town of Orange, by means of a high pressure main, and that the plant at Orange will be dismantled. It would look that the Anaheim folks have been pretty well placed in their gas undertaking, for besides the tentative supply of Orange, it has been supplying gas in Fullerton for some time.

MR. CLARK MONTGOMERY has been elected a Director in the Cincinnati Gas and Electric Company, vice Morris M. White, resigned.

THE Edison Electric Company, of Pomona, Cal., has petitioned the local Board of Trade, to sanction an appeal to the authorities, that it be given the right to increase its selling rates for gas currents supplied, in the sum of 15 cents per 1,000 cubic feet. A very convincing set of analytical figures went with the argument, and it certainly did seem that proof was given that the Company was losing money under the existing schedule rate of $1.15 per 1,000.

"T. V. B.," writing from Philadelphia, under date of Feb. 26th, inclosed the following: "The United Gas Improvement Company yesterday joined in the movement for improved lighting in the central part of the city, when General Agent George presented to Chief McLaughlin, of the electrical bureau, plans for seven ornamental 17-foot poles and lights on the U. G. I. pavement, at Broad and Arch streets, and 6 at Broad street and Columbia avenue. It is pro posed by the U. G. I. to maintain these lamps at its own expense."

"G. T. M.," writing from Portland, Ore., under date of the 20th February, inclosed the following: "The odor of gas prevades the Senate Chamber. What is known as the Brady bill, fixing the price of gas at 80 cents per 1,000, has been the subject of lively controversy in the Multnomah delegation of senators, and it seems destined to emerge with an amendment prepared by Kellaher, authorizing the City Council of Portland to regulate the price, quality and service of the gas sold in that city. The bill in its original form was opposed by a majority of the senatorial delegation. As amended, without fixing a definite price, but allowing the Council to determine the price after investigating the matter in its own way, the bill has the support of all but Nottingham. He has refused to sign the report. The present scope of the bill will also make it the duty of the Council to look into the quality of the gas and to pass ordinances regulating the service. We out this way are sure to feel the effect of the famous Supreme Court verdict.

A BILL is before the Maine Legislature to empower the Merrill-Skinner Company to make, generate, sell, distribute and supply gas or electricity or both for lighting, heating, manufacturing or mechanical purposes."

ANOTHER measure seeking the vise of the Maine Legislature is a petition for leave to incorporate the Bar Harbor Gas Company.

AT the annual meeting of the Meriden (Conn.) Gas Light Company, the officers elected were: Directors, W. Hubbard, Geo. M. Curtis, C. A. Learned, F. C. Sherman, C. F. Linsley, Jno. Billard, E. J. Doolittle and C. T. Dodd; President, Walter Hubbard; Secretary and Treasurer, George M. Curtis; Manager, Chas. A. Learned.

MESSRS. T. C. CALDWELL, B. C. Allen and O. E. Bennett, will, at 10 o'clock of the 10th inst., apply to the Governor of Pennsylvania for a charter for an intended corporation to be called "Union Light and Power Company, the character and object of which are the manufacture and supply of gas for light only, to the public, at the boroughs of Parsons and Miners' Mills, and the township of Planes, in the county of Luzerne."

THE distributing system of the Providence (R. I.) Gas Company will likely be put into North Providence this summer. It is barely possible that the Thornton section will also have gas.

THE Key City Gas Company, of Dubuque, Ia., has filed a certificate announcing a proposed increase in its capital stock of $40,000. With that addition the capital will amount to $540,000.

MR. JOHN F. HOGAN, Editor of "The Gateway," has a masterly article set to the title of "Municipal Ownership Destroys Individual Initiative of People," in a recent issue of "The Detroit Journal."

MR. R. R. RAND, Vice-President of the Minneapolis (Minn.) Gas Light Company, estimates that the failure, during the extreme cold weather of last January, to keep the candle power to the limit required by the statutes, will cost the Company in a refund lump the sum of $11,000. The statute requires an average candle power of 23, whereas, according to the reports submitted by the official Gas Inspector, Mr. A. D. Needs, the lighting value did not exceed an average of 21 candles.

The Market for Gas Securities.

The market for Consolidated gas last week was undeniably of the sort which permits of only a single conclusion. And that conclusion is (do not smile again at this) 80-cent gas is not going to keep a good thing down. We have the knowledge that the rate has largely added to the Company's business, that its physical condition was never heartier nor more adequate to the conditions that confront it. Further, the "unearned increment" already experienced in the shape of increased values for its estates on Long Island, as between the times they were purchased and to-day, is so great as to seem almost incredible. The paying-back of the withheld 20 cents is going on rapidly, and without oppressible friction. It is a herculean task, though. Our noon price to-day (Friday) was 126½–127.

There is little to remark over the general situation, save that it seems, in so far as lighting shares are concerned, safe to say that values all round, so far as quotations go, are sure to show speedily a marked increase.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

MARCH 8.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par*	*Bid.*	*Asked.*
Consolidated Gas Co.	$78,177,000	100	126¼	127
Central Union Gas Co.—				
1st 5's, due 1972, J. & J.	3,000,000	1,000	98	101
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	—	105
Mutual Gas Co.	3,500,000	100	145	155
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	98½	99½
New York & Richmond Gas				
Co. (Staten Island)	1,500,000	100	37	43
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	100	101
New York and East River				
1st 5's, due 1944, J. & J.	3,500,000	1,000	104	107
Con. 5's, due 1945, J. & J.	1,500,000	—	97	101
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	94	100
Standard	5,000,000	100	—	75
Preferred	5,000,000	100	70	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	123½	124
1st Con. 5's, due 1948, M. & N.	15,000,000	—	91½	92
Yonkers	200,000	500	120	—
Out-of Town Companies.				
Bay State	50,000,000	50	1⅝	1⅝
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	65
" 1st Mtg. 5's	500,000	1,000	90	96
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	60	60¼
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,000,000	1,000	104	106¼
Cincinnati Gas and Electric Co.	20,500,000	100	91¼	92
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	90¼	91
Preferred	3,026,500	100	75¼	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	—	105
Mortgages, 6's	3,800,000	—	—	118
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	458,000	—	102	105
Detroit City Gas Co	5,000,000	50	—	50
" Prior Lien 5's	4,619,000	1,000	97	100¼
Detroit Gas Co., 5's	881,000	1,000	75	80
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—

Advertisers' Index.

GAS ENGINEERS. Page

Bartlett, Hayward & Co., Baltimore, Md. 433
Cruse-Kemper Co., Philadelphia, Pa. 420
Davis & Farnum Mfg. Co., Waltham, Mass. 432
Economical Gas Apparatus Construc. Co., Toronto, Ont. 431
Evens & Howard Firebrick Co., St. Louis, Mo. 428
Frank D. Moses, Trenton, N. J. 418
Frederic Egner, Norfolk, Va. 436
Frederick J. Mayer, New York City. 417
H. M. Byllesby & Co., Chicago, Ills. 432
Humphreys & Glasgow, New York City. 432
Improved Equipment Company, New York City. 418
Isbell-Porter Co., Newark, N. J. 420
Kerr Murray Mfg. Co., Fort Wayne, Ind. 433
Quintard Iron Works, New York City. 421
The Gas Machinery Co., Cleveland, O. 416
The United Gas Improvement Co., Philadelphia, Pa. 427
Western Gas Construction Co., Fort Wayne, Ind. 396

GAS WORKS APPARATUS AND CONSTRUCTION.

Bartlett, Hayward & Co., Baltimore, Md. 433
Connelly Iron Sponge & Governor Co., New York City. 429
Continental Iron Works, Brooklyn, N. Y. 434
Cruse-Kemper Co., Philadelphia, Pa. 420
Davis & Farnum Mfg. Co., Waltham, Mass. 432
Deily & Fowler Mfg. Co., Philadelphia, Pa. 436
Economical Gas Apparatus Construc. Co., Toronto, Ont. 431
Evens & Howard Firebrick Co., St. Louis, Mo. 428
Gas Engineering Co., Trenton, N. J. 418
Humphreys & Glasgow, New York City. 432
Improved Equipment Company, New York City. 418
Isbell-Porter Co., New York City. 420
Kerr Murray Mfg. Co., Fort Wayne, Ind. 433
Lloyd Construction Co., Detroit, Mich. 422
Quintard Iron Works Co., New York City. 421
R. D. Wood & Co., Philadelphia, Pa. 434
Riter-Conley Mfg. Co., Pittsburgh, Pa. 419
Stacey Mfg. Co., Cincinnati, O. 435
The Gas Machinery Co., Cleveland, O. 416
The United Gas Improvement Co., Philadelphia, Pa. 427
Western Gas Construction Co., Fort Wayne, Ind. 396

PROCESSES.

Bartlett, Hayward & Co., Baltimore, Md. 433
Economical Gas Apparatus Construc. Co., Toronto, Ont. 431
Humphreys & Glasgow, New York City. 432
Improved Equipment Company, New York City. 418
The Gas Machinery Co., Cleveland, O. 416
The United Gas Improvement Co., Philadelphia, Pa. 427
Western Gas Construction Co., Fort Wayne, Ind. 396

SCRUBBERS AND CONDENSERS.

Bartlett, Hayward & Co., Baltimore, Md. 433
Continental Iron Works, Brooklyn, N. Y. 434
Cruse-Kemper Co., Philadelphia, Pa. 420
Davis & Farnum Mfg. Co., Waltham, Mass. 432
Economical Gas Apparatus Construc. Co. Toronto, Ont. 431
Evens & Howard Firebrick Co., St. Louis, Mo. 428
Isbell-Porter Co., Newark, N. J. 420
Kerr Murray Mfg. Co., Fort Wayne, Ind. 433
Quintard Iron Works, New York City. 421
R. D. Wood & Co., Philadelphia, Pa. 434
Riter-Conley Mfg. Co., Pittsburgh, Pa. 419
Stacey Mfg. Co., Cincinnati, O. 435
The Gas Machinery Co., Cleveland, O. 416
The United Gas Improvement Co., Philadelphia, Pa. 427
Western Gas Construction Co., Fort Wayne, Ind. 396

PRODUCER POWER PLANTS.

Economical Gas Apparatus Construc. Co., Toronto, Ont. 431
R. D. Wood & Co., Philadelphia, Pa. 434

TAR AND CARBONIC ACID EXTRACTOR.

Bartlett, Hayward & Co., Baltimore, Md. 433
Economical Gas Apparatus Construc. Co., Toronto, Ont. 431
Isbell-Porter Co., Newark, N. J. 420
Kerr Murray Mfg. Co., Fort Wayne, Ind. 433
Stacey Mfg. Co., Cincinnati, O. 435
The Gas Machinery Co., Cleveland, O. 416
The United Gas Improvement Co., Philadelphia, Pa. 427
Western Gas Construction Co., Fort Wayne, Ind. 396

AMMONIA CONCENTRATORS.

Bartlett, Hayward & Co., Baltimore, Md. 433
Michigan Ammonia Works, Detroit, Mich. 433
The Gas Machinery Co., Cleveland, O. 416
Western Gas Construction Co., Fort Wayne, Ind. 396

GAS METERS.

American Meter Co., New York and Philadelphia. 439
D. McDonald & Co., Albany, N. Y. 437
Helme & McIlhenny, Philadelphia, Pa. 439
John J. Griffin & Co., Philadelphia, Pa. 440
Keystone Meter Co., Royersford, Pa. 438
Maryland Meter and Mfg. Co., Baltimore, Md. 438
Metric Metal Co., Erie, Pa. 439
Nathaniel Tufts Meter Co., Boston, Mass. 438
New York Improved Meter Co., New York City. 438
Pittsburg Meter Co., East Pittsburg, Pa. 422
Rotary Meter Co., New York City. 415
Sprague Meter Co., Bridgeport, Conn. 437
United States Meter Co., Brooklyn, N. Y. 439

PREPAYMENT METERS.

American Meter Co., New York and Philadelphia. 439
D. McDonald & Co., Albany, N. Y. 437
Helme & McIlhenny, Philadelphia, Pa. 439
John J. Griffin & Co., Philadelphia, Pa. 440
Keystone Meter Co., Royersford, Pa. 438
Nathaniel Tufts Meter Co., Boston, Mass. 438
New York Improved Meter Co. New York City. 438
Pittsburg Meter Co., East Pittsburg, Pa. 422
Sprague Meter Co., Bridgeport, Conn. 437

PREPAYMENT METER ATTACHMENTS.

New York Improved Meter Co., New York City. 438

WATER METERS.

Pittsburg Meter Co., East Pittsburg, Pa. 422

GAS AND WATER PIPES.

Davis & Farnum Mfg. Co., Waltham, Mass. 432
Donaldson Iron Co., Emaus, Pa. 424
Economical Gas Apparatus Construc. Co., Toronto, Ont. 431
R. D. Wood & Co., Philadelphia, Pa. 434

GAS COALS.

Berwind-White Coal Mining Co., New York and Phila. 430
Perkins Co., New York City. 430
Westmoreland Gas Coal Co., Philadelphia, Pa. 431

GAS MAIN STOPPERS.

Safety Gas Main Stopper Co., New York City. 429

MAIN AND SERVICE LAYING.

Sullivan Bros., Flushing, N. Y. 431

GAS TAPPING MACHINES.

George Light, Dayton, O. 431
H. Mueller Manufacturing Co. Decatur, Ills. 423

CANNEL COALS.

Perkins & Co., New York City. 430

STOKING MACHINERY.

G. A. Bronder, New York City. 429

CONVEYORS—ALL KINDS.

Bartlett, Hayward & Co., Baltimore, Md. 433
Brown Hoisting Machinery Co., Cleveland, O. 424
Cruse-Kemper Co., Philadelphia, Pa. 420
C. W. Hunt Company, New York City. 432
Economical Gas Apparatus Construc. Co., Toronto, Ont. 431
G. A. Bronder, New York City. 429
Kerr Murray Mfg. Co., Fort Wayne, Ind. 433
The Gas Machinery Co., Cleveland, O. 416
Western Gas Construction Co., Fort Wayne, Ind. 396

CHARGING BARROWS & COAL WAGONS.

Davis & Farnum Mfg. Co., Waltham, Mass. 432
Kerr Murray Mfg. Co., Fort Wayne, Ind. 433
Stacey Mfg. Co., Cincinnati, O. 435

GAS ENRICHERS.

Standard Oil Co., New York City. 387

COKE CRUSHERS.

Bartlett, Hayward & Co., Baltimore, Md. 433
C. M. Keller, Columbus, Ind. 431

GAS METER CONNECTIONS.

H. Mueller Manufacturing Co., Decatur, Ills. 423

GAS COCKS.

H. Mueller Manufacturing Co., Decatur, Ills. 423

GAS GAUGES.

The Bristol Co., Waterbury, Conn. 424

GAS GOVERNORS.

Chaplin-Fulton Mfg. Co., Pittsburg, Pa. 437
Connelly Iron Sponge & Governor Co., New York City. 429
Evens & Howard Firebrick Co., St. Louis, Mo. 428
Isbell-Porter Co., Newark, N. J. 420
Pittsburg Meter Co., East Pittsburg, Pa. 422
R. D. Wood & Co., Philadelphia, Pa. 434
Reynolds Gas Regulator Co., Anderson, Ind. 431

CEMENTS.

C. L. Gerould, New Castle, Pa. 428
Strassburger Bros., Chicago, Ills. 428

RETORTS AND FIREBRICKS.

Baltimore Retort and Firebrick Co., Baltimore, Md. 428
Didier-March Co., New York City. 417
Evens & Howard Firebrick Co., St. Louis, Mo. 428
Gas Bench Construction Co., St. Louis, Mo. 421
Henry Maurer & Son, New York City. 421
Improved Equipment Company, New York City. 418
James Gardner, Jr., Co., Bolivar, Pa. 430
J. H. Gautier & Co., Jersey City, N. J. 423
Laclede-Christy Clay Products Co., St. Louis, Mo. 435
Missouri Firebrick Co., St. Louis, Mo. 428
Parker-Russell Mining and Mfg. Co., St. Louis, Mo. 414

INCLINED RETORTS.

Baltimore Retort and Firebrick Co., Baltimore, Md. 428
Didier-March Co., New York City. 417
Gas Bench Construction Co., St. Louis, Mo. 421
Improved Equipment Company, New York City. 418
Laclede-Christy Clay Products Co., St. Louis, Mo. 435
Parker-Russell Mining and Mfg. Co., St. Louis, Mo. 414

VERTICAL S'S.

Connelly Iron Sponge & Gov. Co. (Drake's [Eng.] System) 429
Didier-March Co., New York City. 417
Gas Bench Construction Co., St. Louis, Mo. 421
Improved Equipment Company, New York City. 418
Laclede-Christy Clay Products Co., St. Louis, Mo. 435
Parker-Russell Mining and Mfg. Co., St. Louis, Mo. 414

REGENERATIVE FURNACES.

Baltimore Retort and Firebrick Co., Baltimore, Md.. 438
Bartlett, Hayward & Co., Baltimore, Md..... 433
Didier-March Co., New York City..... 417
Gas Bench Construction Co., St. Louis, Mo..... 421
Improved Equipment Company, New York City..... 418
J. H. Gautier & Co., Jersey City, N. J..... 428
Missouri Firebrick Co., St. Louis, Mo..... 428
Parker-Russell Mining and Mfg. Co., St. Louis, Mo... 414

SELF-SEALING MOUTHPIECE DOORS.

Bartlett, Hayward & Co., Baltimore, Md..... 433
Continental Iron Works, Brooklyn, N. Y..... 434
Davis & Farnum Mfg. Co., Waltham, Mass..... 432
Isbell-Porter Co., Newark, N. J..... 420
Improved Equipment Company, New York City..... 418
Kerr Murray Mfg. Co., Fort Wayne, Ind..... 433
Quintard Iron Works, New York City..... 421
R. D. Wood & Co., Philadelphia, Pa..... 434
Stacey Mfg. Co., Cincinnati, O..... 435
The Gas Machinery Co., Cleveland, O..... 416
Western Gas Construction Co., Fort Wayne, Ind..... 396

INCANDESCENT GAS LAMPS.

General Gas Light Co., Kalamazoo, Mich..... 423
Welsbach Company, Gloucester, N. J..... 426

BURNERS.

Wm. M. Crane Co., New York City..... 421

STREET LAMPS.

Thos. T. W. Miner, New York City..... 431
Welsbach Street Lighting Co., New York and Phila.. 426

PURIFIERS.

Bartlett, Hayward & Co., Baltimore, Md..... 433
Connelly Iron Sponge & Governor Co., New York City. 429
Cruse-Kemper Co., Philadelphia, Pa..... 420
Davis & Farnum Mfg. Co., Waltham, Mass..... 432
Isbell-Porter Co., Newark, N. J..... 420
Kerr Murray Mfg. Co., Fort Wayne, Ind..... 433
Quintard Iron Works, New York City..... 421
R. D. Wood & Co., Philadelphia, Pa..... 434
Stacey Mfg. Co., Cincinnati, O..... 435
The United Gas Improvement Co., Philadelphia, Pa... 427
Western Gas Construction Co., Fort Wayne, Ind..... 396

VALVES.

Bartlett, Hayward & Co., Baltimore, Md..... 433
Continental Iron Works, Brookln, N. Y..... 434
Davis & Farnum Mfg. Co., Waltham, Mass..... 432
Economical Gas Apparatus Construc. Co., Toronto, Ont. 431
Isbell-Porter Co., Newark, N. J..... 432
Kerr Murray Mfg. Co., Fort Wayne, Ind..... 433
Ludlow Valve Manufacturing Co., Troy, N. Y..... 432
R. D. Wood & Co., Philadelphia, Pa..... 434
Stacey Mfg. Co., Cincinnati, O..... 435
The Gas Machinery Co., Cleveland, O..... 416
The P. H. & F. M. Roots Co., Connersville, Ind..... 423
Western Gas Construction Co., Fort Wayne, Ind..... 396

PURIFYING MATERIALS.

Connelly Iron Sponge & Governor Co., New York City 429
The United Gas Improvement Co., Philadelphia, Pa... 427
Western Oxide and Specialty Co., Chicago, Ills..... 430

EXHAUSTERS.

Connelly Iron Sponge & Governor Co., New York City 429
Connersville Blower Company, Connersville, Ind..... 436
Davis & Farnum Mfg. Co., Waltham, Mass..... 432
Isbell-Porter Company, Newark, N. J..... 420
Kerr Murray Mfg. Co., Fort Wayne, Ind..... 433
Piqua Blower Co., Piqua, O..... 421
The P. H. & F. M. Roots Co., Connersville, Ind..... 423

HIGH PRESSURE GAS GOODS.

H. Mueller Manufacturing Co., Decatur, Ills..... 423

PURIFIER AND SCRUBBER TRAYS.

Bartlett, Hayward & Co., Baltimore, Md..... 433
Cabot Mfg. Co., Hoboken, N. J..... 431
Western Gas Construction Co., Fort Wayne, Ind..... 396

PIPE LINE TOOLS.

H. Mueller Manufacturing Co., Decatur, Ills..... 423

GAS PLANT TOOLS.

H. Mueller Manufacturing Co., Decatur, Ills..... 423

GAS STOVES.

American Meter Co., New York and Philadelphia..... 425
Keystone Meter Co., Royersford, Pa..... 438
Maryland Meter & Manufacturing Co., Baltimore, Md... 438
Nathaniel Tufts Meter Co., Boston, Mass..... 439

HOT WATER HEATERS.

Humphrey Co., Kalamazoo, Mich..... 422

GASHOLDERS.

Bartlett, Hayward & Co., Baltimore, Md..... 433
Continental Iron Works, Brooklyn, N. Y..... 434
Cruse-Kemper Co., Philadelphia, Pa..... 420
Davis & Farnum Mfg. Co., Waltham, Mass..... 432
Deily & Fowler Mfg. Co., Philadelphia, Pa..... 436
Economical Gas Apparatus Construc. Co., Toronto, Ont. 431
Kerr Murray Mfg. Co., Fort Wayne, Ind..... 433
R. D. Wood & Co., Philadelphia, Pa..... 434
Riter-Conley Mfg. Co., Pittsburgh, Pa..... 419
Stacey Mfg. Co., Cincinnati, O..... 435
Western Gas Construction Co., Fort Wayne, Ind..... 396

STORAGE TANKS.

Bartlett, Hayward & Co., Baltimore, Md..... 433
Davis & Farnum Mfg. Co., Waltham, Mass..... 432
Quintard Iron Works, New York City..... 421
Stacey Mfg. Co., Cincinnati, O..... 435
Western Gas Construction Co., Fort Wayne, Ind..... 396

PATENTS, TRADE-MARKS, COPYRIGHTS.

Royal E. Burnham, Washington, D. C..... 429

ANNUAL MEETING.

OFFICE OF THE UNITED GAS IMPROVEMENT CO.,
N. W. CORNER BROAD AND ARCH STS.,
PHILADELPHIA, February 15, 1909.

The Annual Meeting of the Stockholders of The United Gas Improvement Company will be held at the office of the Company, Northwest Corner of BROAD AND ARCH STREETS, PHILADELPHIA, on Monday, May 3, 1909, at 12 o'clock, NOON, for the purpose of electing a President and six Directors, to serve for the ensuing year, considering and acting upon the subject of a proposed increase in the capital stock of the Company from 918,005 shares of the par value of $50 each, to 1,000,467 shares of the par value of $50 each, and transacting such other business as may properly come before the meeting. The stock transfer books will be closed from 3 P.M., April 21, 1909, until 9 A.M., May 4, 1909. By order of the Board of Directors.

1759-5 W. F. DOUTHIRT, Secretary.

CITY OF BALTIMORE, LAMPS AND LIGHTING DEPARTMENT.

To Manufacturers of Street Lamp Burners and Fixtures:

The Superintendent of Lamps and Lighting of the City of Baltimore, City Hall, desires to purchase incandescent gas and gasoline lamp burners for street lighting purposes—the burners to produce a light equal to between 55 and 60-candle power.

In addition to the above and with a view to the improvement of the present equipment, information is desired concerning the most modern type of incandescent gas and naphtha street lighting fixtures and the terms upon which such fixtures can be obtained by the city.

In order to demonstrate the light-giving power and the artistic appearance of such equipment, tests and street exhibitions may be made, if necessary.

SUPERINTENDENT OF LAMPS AND LIGHTING,
1761-1 Baltimore, Md.

Wanted, Position

By Graduate of Boston Cooking School as Lecturer and Demonstrator for Gas Companies.

An experienced person with best of credentials from most every city of note in the United States.

Address, S. E. CRAIG,
1761-2 44 E., McMillan street, Cincinnati, O.

Situation Wanted.

Young man, 23 years, with 2 years' experience in office bookkeeping, and 2 years' experience in soliciting, with good results, desires position of either kind.

1761-2 Address, "G. H.," care this Journal.

Position Wanted

As Manager or Superintendent

Of water gas light company or electric lighting company, or combination of both. At present am superintendent of two gas and electric companies, high and low pressure gas, in State of Massachusetts. Member American Society of Mechanical Engineers and American Institute Electrical Engineers. Western States preferred if possible. Salary $2,500 per year. Address, "S. A.,"
1761-2 Care this Journal.

WANTED,

Position as Meter Repairer or Foreman

In a small gas company. Fourteen years' experience and references.

Address, "DIA,"
1761-1 Care this Journal.

Position Wanted

As Manager or Superintendent,

By competent gas man, 35 years of age, married, strictly sober, with operating experience both as manager and superintendent in actual charge of plants. A man who can show and give results; 17 years' experience; now acting as manager of coal gas plant in city of 15,000. Will have to give present people 60 days' notice. Address,
1727-eot-tf "RESULTS," care this Journal.

Position Wanted

As Superintendent,

By a competent gas man who has had practical experience in all branches of the business, both coal and water gas. At present employed. A-1 references.
1755-tf Address, "R. C.," care this Journal

Position Wanted

By a Successful, Experienced Manager or Superintendent of Gas and Electrical Property.

Experienced in the engineering as well as the business end of the combined properties. Will accept position with either combined or separate property. Correspondence confidential. Will go anywhere. Best of references. Can accept position at once. Address, "EXPERIENCE,"
1757-5 Care this Journal.

WANTED,

Position as Manager or Superintendent.

Experienced man, will be open for engagement March 1, 1909. Has operated both coal and water gas plants. Best of references.
1760-2 Address, "J. K.," care this Journal.

Position Wanted

AS GASFITTER,

Or in any capacity around a gas plant. Five years' experience in water gas. References.

Address, "P. O. BOX 288,"
1761-1 Bay Shore, L. I.

POSITION WANTED

As Superintendent,

By a competent, practical man, experienced in all details, with a company that will appreciate close application to business. Either gas or combined gas and electric plant. Middle West preferred. Address, "K. K.,"
1761-4 Care this Journal.

GAS MAKER WANTED.

Water gas. Steady position; $50 per month and board. Address, H. J. BOSTWICK,
1761-1 Clifton Springs, N. Y.

WANTED,

Cashier for Gas and Electric Light Office

In town of 25,000. Only parties having experience and can furnish best of references need apply. State salary expected. Address, "S. S. H.,"
1761-2 Care this Journal.

WANTED,

Foreman Thoroughly Posted in the Manufacture of Coal Gas and Recovery of Ammonia,

In a growing city in the Central West with a population of 16,000. State experience, references, and wages desired. Address, "B. A. C.,"
1761-3 Care this Journal.

FOR SALE,

A Good Paying, Well Developed Gas Plant,

In a town of 10,000 inhabitants, in a Northern State. Can be had at a figure assuring a good salary and interest on the investment to a practical gas man. For full particulars address JNO. H. FITZGERALD,
1760-3 Box 849, Beaumont, Tex.

Utilize Your Gas Liquor.

NO EXTRA LABOR OR OPERATING EXPENSES.

IMPROVED AMMONIA CONCENTRATOR.

About 100 in use. Write to

STROH & OSIUS, Patentees, or
MICHIGAN AMMONIA WORKS, - Detroit, Mich.

HUMPHREY GAS ARC LAMPS

Are the world s standard. For proof, note how soon competitors' salesmen will feel obliged to refer to the Humphrey.

HUMPHREY MANTLES

Were developed because of the need of a high grade uniform mantle to insure highest efficiency of the lamps. Our full line now includes single burner mantles of all kinds. Try those for inverted single burners. They are unquestionably the best made. Rings to fit all burners.

GENERAL GAS LIGHT CO.,

KALAMAZOO.

NEW YORK. SAN FRANCISCO.

PARKER-RUSSELL MINING AND MFG. CO.,

ST. LOUIS, MO.

ST. LOUIS OFFICE: Suite 501-508 Liggett Building, 8th and Chestnut Streets.
NEW YORK OFFICE: 45 Broadway.

GAS RETORT BENCHES, STOKING MACHINERY, STAND-PIPE CLEANER AND STRAIGHT STAND-PIPE SYSTEM.

GAS RETORTS AND FIREBRICK.

We Manufacture Gas Retorts and Settings, Furnace Blocks and Fire Clay Tiles of Every Description.

Benches.--We erect GAS RETORT BENCHES with Horizontal retorts having closed ends up to 10 feet in length, or Through retorts up to 20 feet in length.

Slopers.--Also, SLOPERS on improved lines for Inclined Retorts.

Stoking Machinery.--Sole Agents for U. S. and Canada for the Fiddes-Aldridge Simultaneous Discharging Charger. The "F. A.," or "One-Stroke" Machine. Cost of Carbonizing reduced to minimum. No Dust. Silent. No Waste of Coal. No Injury to Retorts.

Water Gas Linings.--We make a specialty of WATER GAS BLOCKS, and supply brick of superior grade for checkerwork.

Stand-Pipe Cleaner and Straight Stand-Pipe System.--Agents for the sale of the Stand-Pipe Cleaner and Straight Stand-Pipe System of the United Gas Improvement Company.

Retort Houses and Conveying Machinery.--We also build Retort Houses, Coal and Coke Conveying Machinery. Plans, specifications and estimates cheerfully furnished.

CORRESPONDENCE SOLICITED.

ALL CONTRACTS MADE AS OF ST. LOUIS.

FOR YOUR SELECTION

Orders for a Second or More

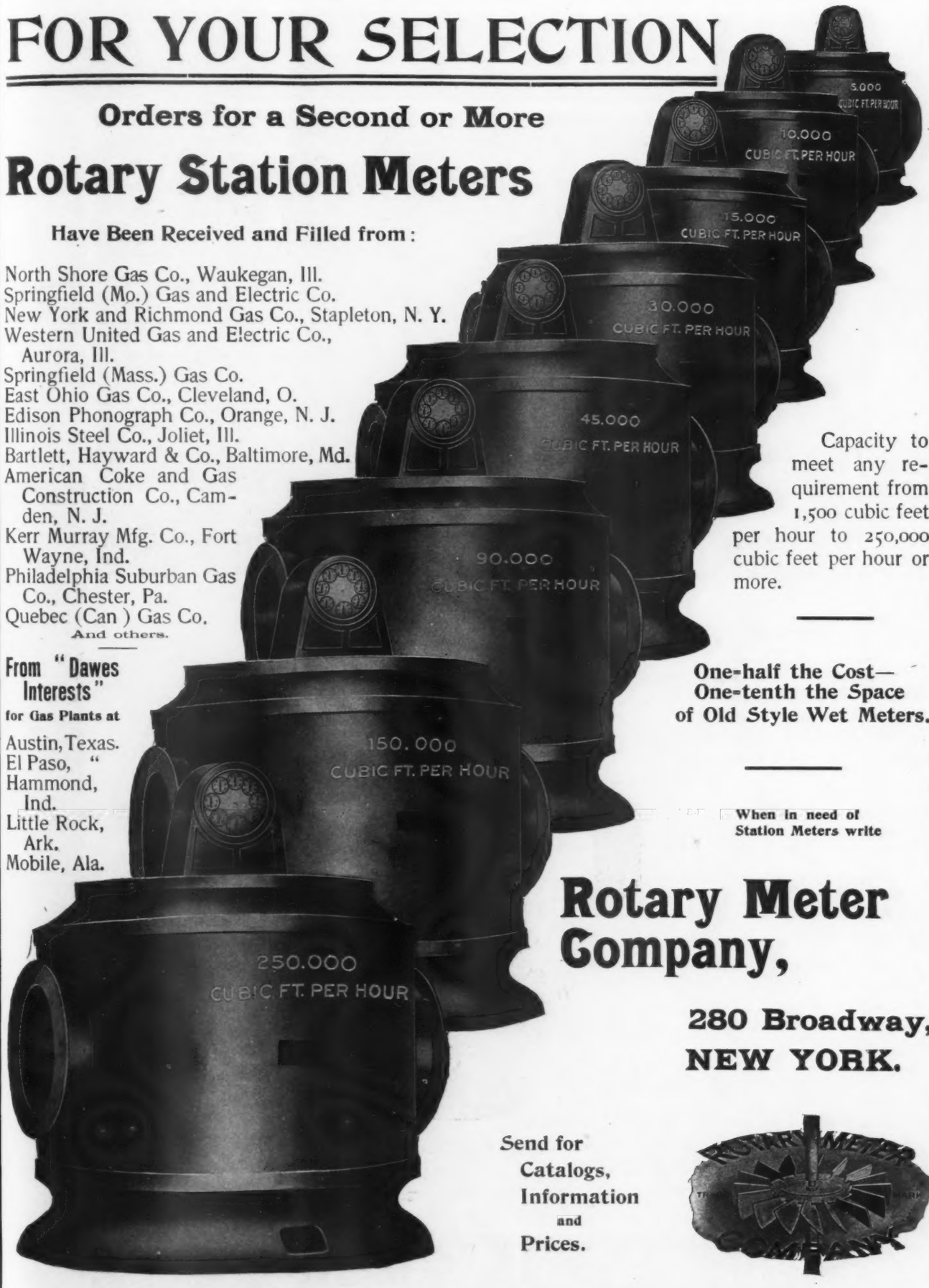
Rotary Station Meters

Have Been Received and Filled from:

North Shore Gas Co., Waukegan, Ill.
Springfield (Mo.) Gas and Electric Co.
New York and Richmond Gas Co., Stapleton, N. Y.
Western United Gas and Electric Co., Aurora, Ill.
Springfield (Mass.) Gas Co.
East Ohio Gas Co., Cleveland, O.
Edison Phonograph Co., Orange, N. J.
Illinois Steel Co., Joliet, Ill.
Bartlett, Hayward & Co., Baltimore, Md.
American Coke and Gas Construction Co., Camden, N. J.
Kerr Murray Mfg. Co., Fort Wayne, Ind.
Philadelphia Suburban Gas Co., Chester, Pa.
Quebec (Can) Gas Co.
And others.

From "Dawes Interests"
for Gas Plants at

Austin, Texas.
El Paso, "
Hammond, Ind.
Little Rock, Ark.
Mobile, Ala.



Capacity to meet any requirement from 1,500 cubic feet per hour to 250,000 cubic feet per hour or more.

**One-half the Cost—
One-tenth the Space
of Old Style Wet Meters.**

When in need of Station Meters write

Rotary Meter Company,

**280 Broadway,
NEW YORK.**

Send for Catalogs, Information and Prices.

P. PLANTINGA, President W. E. STEINWEDELL, Secretary

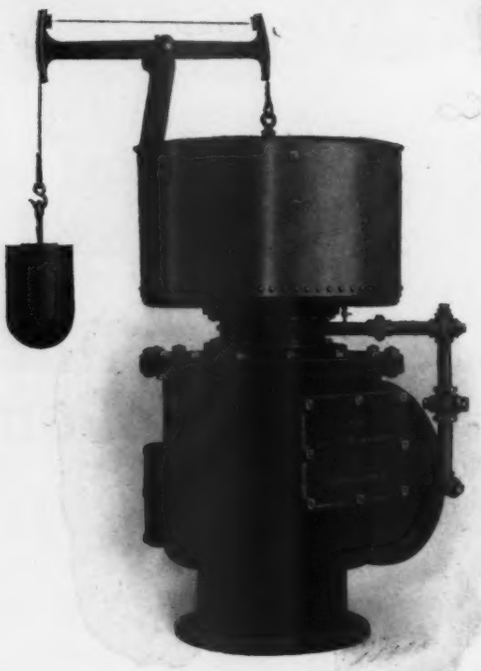
THE GAS MACHINERY CO.,

Main Office and Shops

CLEVELAND, OHIO.

NEW YORK OFFICE, - - 56 PINE STREET.

COAL AND WATER GAS APPARATUS,
EXHAUSTERS, CONDENSERS, SCRUBBERS,
TAR EXTRACTORS, WASHERS, PURIFIERS,
VALVES, CONNECTIONS,
BY PRODUCT MACHINERY,
COMPLETE GAS PLANTS.



RETORT HOUSE GOVERNOR.

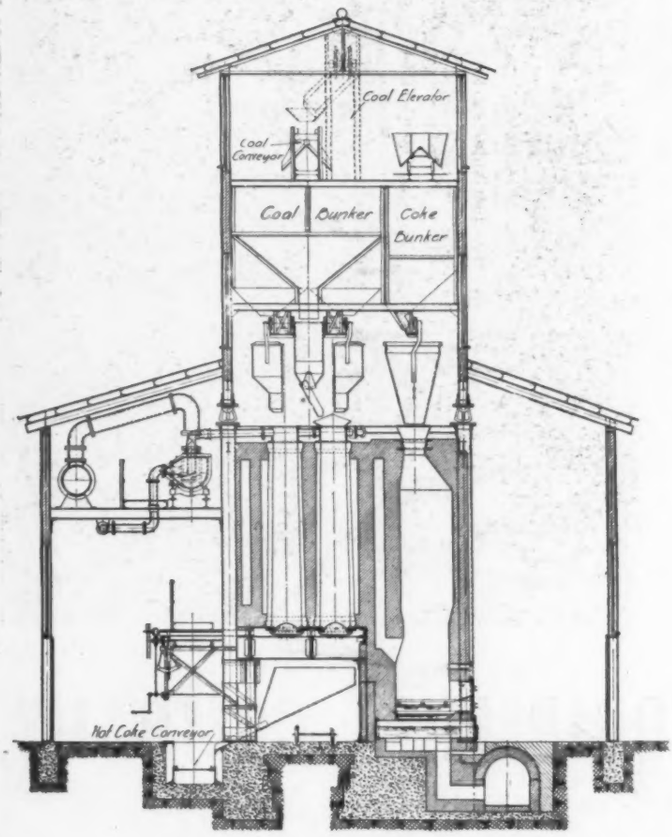
THE GAS MACHINERY CO.
CLEVELAND, OHIO.

DIDIER-MARCH COMPANY,

Hudson Terminal Building,

WORKS:
Keasbey, Perth Amboy, N. J.

50 Church Street,
NEW YORK, N. Y.



Cross Section of Retort House System Koerting For Vertical Benches

Dessau System of Vertical Retorts.

"The Only System in Successful Operation."

U. S. Patent No. 904043.

"Process Patent for the Carbonization of Coal in Vertical Retorts."

U. S. Patent No. 906187.

"Feeding Device."

U. S. Patent No. 899503.

"Retort House."

U. S. Patent No. 801268.

"Operating Mechanism for Bottom Mouthpieces."

339 Benches, with 3518 Retorts in operation and under construction.

TOTAL DAILY PRODUCING CAPACITY, 50,000,000 CUBIC FEET.

Amount of gas produced per man in 24 hours, 360,000 cu. ft.
Ten per cent. Increase in Yield.
Twenty to Forty per cent. Increase in Yield of Ammonia.
Best Quality of Coke.
Least percentage of Breeze. Low Fuel Consumption.
Tar produced low in Carbon.
Extreme low cost of Retort House Labor.
Minimum expense in wear and tear.
NO NAPHTHALENE.
NO CYANOGEN.

Correspondence Solicited.

FREDERICK J. MAYER, General Manager.

WE STOP CLINKERS.

SMALL PLANTS SHOW THE SAME PERCENTAGE OF SAVINGS AS LARGE PLANTS.

DO NOT HESITATE TO ASK US FOR PRICES FOR REFILLING BECAUSE YOUR PLANT IS SMALL.

WE KNOW WE CAN PUT GAS IN **YOUR HOLDER** AT **LESS COST** THAN YOU ARE NOW DOING IT.

LET US SHOW YOU.

Send for Bulletin.

SHOWING A PLANT OF TWO BENCHES GIVING REMARKABLE RESULTS.

THE IMPROVED EQUIPMENT COMPANY,

MAIN OFFICES: 60 WALL STREET, NEW YORK.

GAS BENCHES—GAS WORKS.

SOLE LICENSEES FOR THE DOHERTY BENCH FUEL ECONOMIZER

ONG DISTANCE TELEPHONE, 1503-D.

FRANK D. MOSES, President.

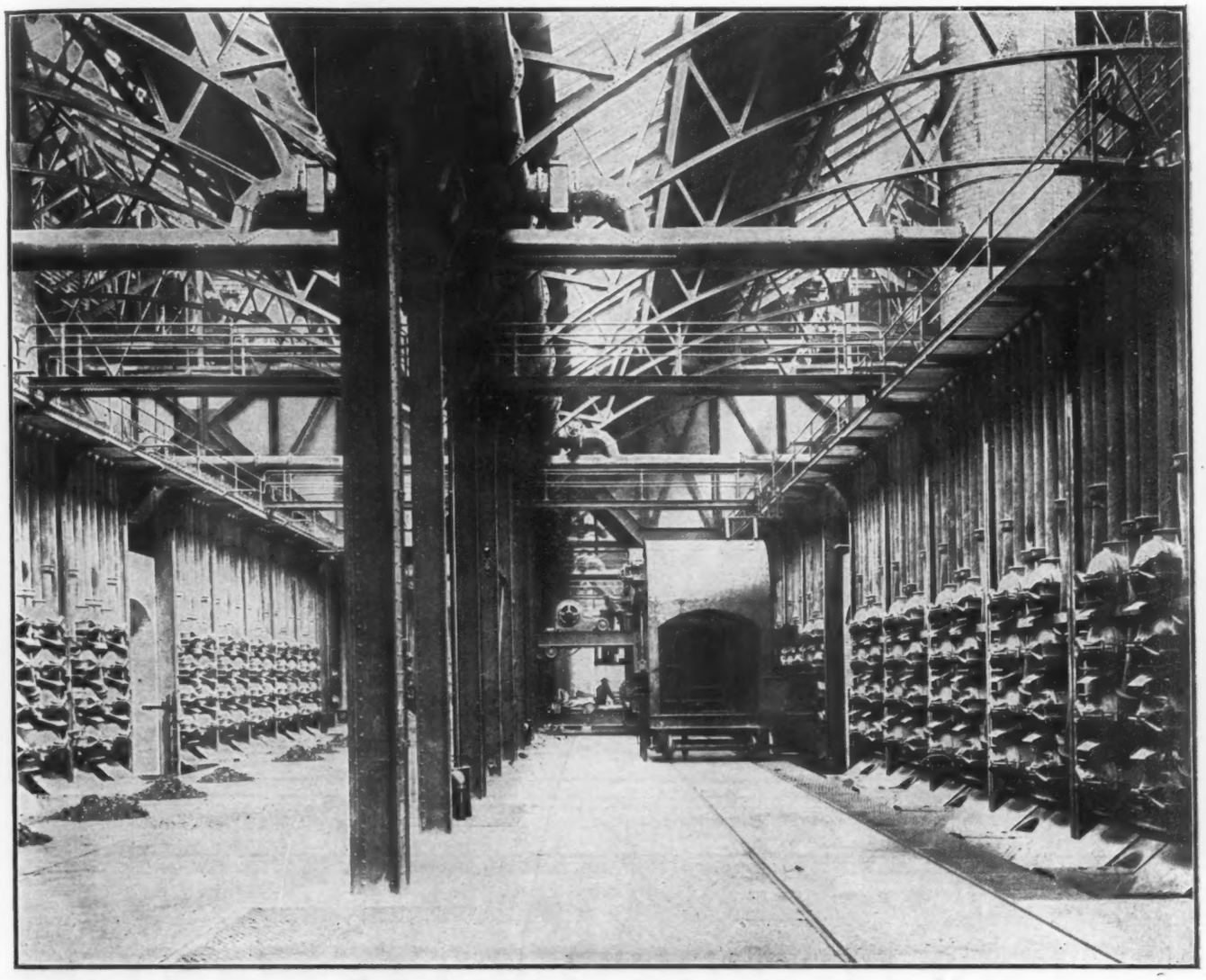
GAS ENGINEERING CO.,

MANUFACTURERS AND ERECTORS OF

COMPLETE GAS WORKS.

SPECIAL ATTENTION GIVEN TO LARGE PURIFIERS.

OFFICE AND WORKS, - - - - - - TRENTON, N. J.



Eleven Millions Capacity in One Retort House.

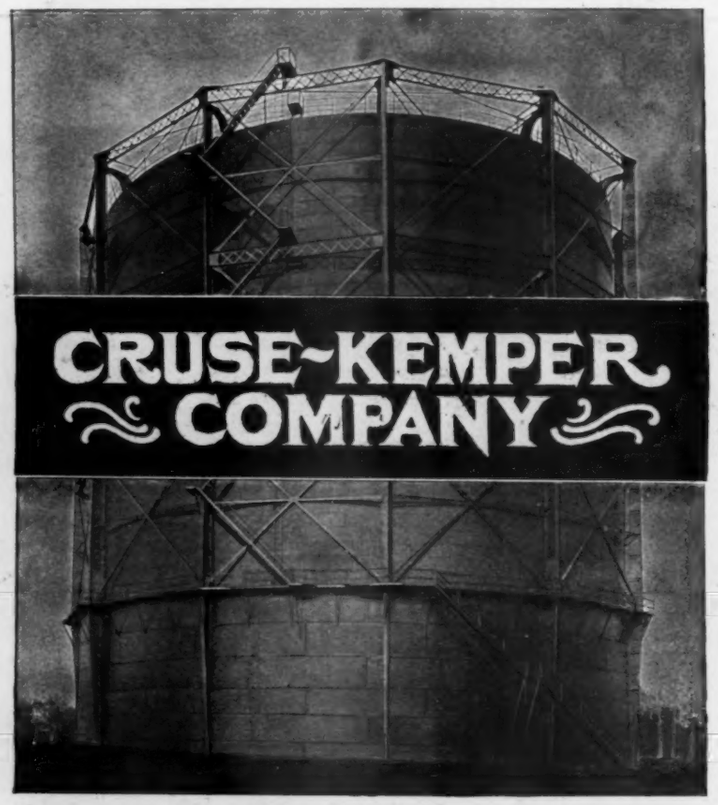
RITER-CONLEY MFG. COMPANY,

PITTSBURGH.

PLATE AND STRUCTURAL WORK OF EVERY DESCRIPTION.

COMPLETE COAL GAS PLANTS.

GAS ENGINEERS,
BUILDERS OF
GAS HOLDERS,
PURIFIER BOXES,
CONDENSERS,
SCRUBBERS,
STEEL TANKS,
PLATE METAL CONSTRUCTION.



STEEL WATER AND TRANSMISSION TOWERS.
STEEL BUILDINGS and ROOF TRUSSES.
STRUCTURAL IRON & STEEL WORK IN GENERAL.

OFFICE AND WORKS, - - - - AMBLER, PA.

J. S. DeHART, JR., PRESIDENT
A. F. WEHNER, SECRETARY
R. K. WEHNER, TREASURER

ISBELL-PORTER COMPANY

GAS ENGINEERS & BUILDERS OF GAS WORKS

BENCH WORK
CHARGING AND DISCHARGING MACHINERY
MACKENZIE EXHAUSTERS
PRIMARY AND SECONDARY CONDENSERS FOR FRESH OR SALT WATER

ISBELL VALVES SPECIALS
TAR EXTRACTORS
P. & A. TAR EXTRACTORS FOR WATER GAS
ROTARY AMMONIA SCRUBBERS
SHAVING SCRUBBERS PURIFIERS STREET GOVERNORS

MAIN OFFICE AND WORKS
BRIDGE & OGDEN STREETS
NEWARK, N.J.
ESTABLISHED 1865

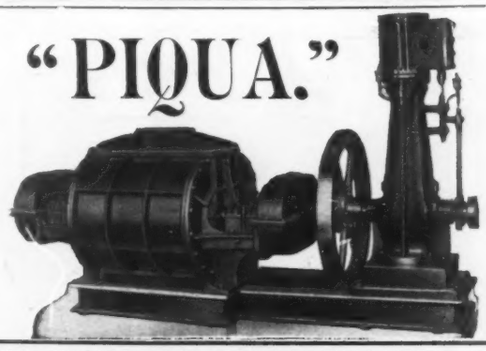
GAS EXHAUSTERS AND BLOWERS.

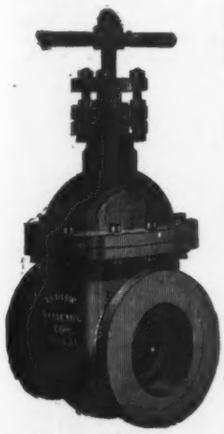
We have a full line of sizes for all standard pressures. The design, material and workmanship is A-1. Prompt Delivery and Reasonable Prices. WHY NOT give us YOUR requirements?

THE PIQUA BLOWER CO.,

PIQUA, OHIO.

"PIQUA."





THE

Ludlow Valve Mfg. Co.,

TROY, N. Y., U. S. A.

Double and Single Gate Valves, ¼" to 72",

—FOR—

Gas, Water, Steam, Oil, Ammonia, Etc.

HOT GAS VALVES A SPECIALTY.

Send for Catalogue.

QUINTARD IRON WORKS CO.,

Foot of Twelfth Street and East River, New York,

BENCH WORK,
CONDENSERS,
SHAVING SCRUBBERS,
CAST IRON FLANGED PIPE,
RIVETED STEEL PIPE.

FREDERICK W FLOYD, Engineer.

ESTABLISHED 1856.

HENRY MAURER & SON,

Manufacturers of

High Grade Firebrick, Blocks, Tiles,

ETC.,

Works: Maurer, N. J. Office: 420 E. 23d St., N. Y. City.

L. C. HAMLINK, PRES. AUGUST COURT, SEC'Y.

GAS BENCH CONSTRUCTION COMPANY,

METROPOLITAN BUILDING, ST. LOUIS, MO.,

Engineers and Builders of all styles of Standard and Special Benches from one to twelve Retorts, Horizontal, Vertical, or Inclined.

We will guarantee "Better Benches," to be easier to control, make more gas per retort, and operate with less fuel than any bench on the market.

ALL WORKMANSHIP AND MATERIAL GUARANTEED.

PRACTICAL HANDBOOK ON GAS ENGINES, WITH INSTRUCTIONS FOR CARE AND WORKING OF THE SAME.

By G. LIECKFELD, C.E. Translated with Permission of the Author, by GEORGE M. RICHMOND, M.E. Price, $1

For Sale by A. M. CALLENDER & CO., 42 Pine St., New York City.

A gas office is like paradise when all the consumers have

"Ironclad" Dry Gas Meters.

There are no complaints---everybody is satisfied.

Read our Catalogue G-1 about "Ironclad" Meters.

Pittsburg Meter Co.

General Office & Works, East Pittsburg, Pa.

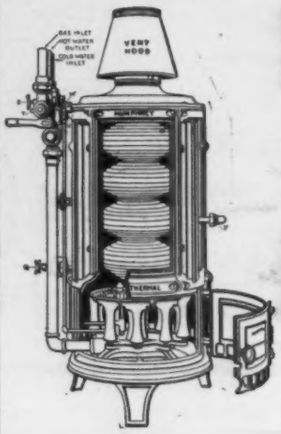
New York, 149 Broadway.
Chicago, 256 Madison Street.
Kansas City, 6 West Tenth Street.
Minneapolis, 409-411 Second Ave., South.

Manufacturers of Gas Meters and Water Meters.

LLOYD CONSTRUCTION COMPANY

GAS APPARATUS.

DETROIT - MICHIGAN



Humphrey Auto-Thermal Instantaneous Water Heaters

Have every known desirable feature helping to efficiency, economy, durability and absolute safety.

FULLY GUARANTEED.
PRICES LOW.
QUALITY AND SERVICE HIGH.

Will you help us sell them?

HUMPHREY CO.,
Kalamazoo Mich., U. S. A.

BINDER

FOR THE

JOURNAL.

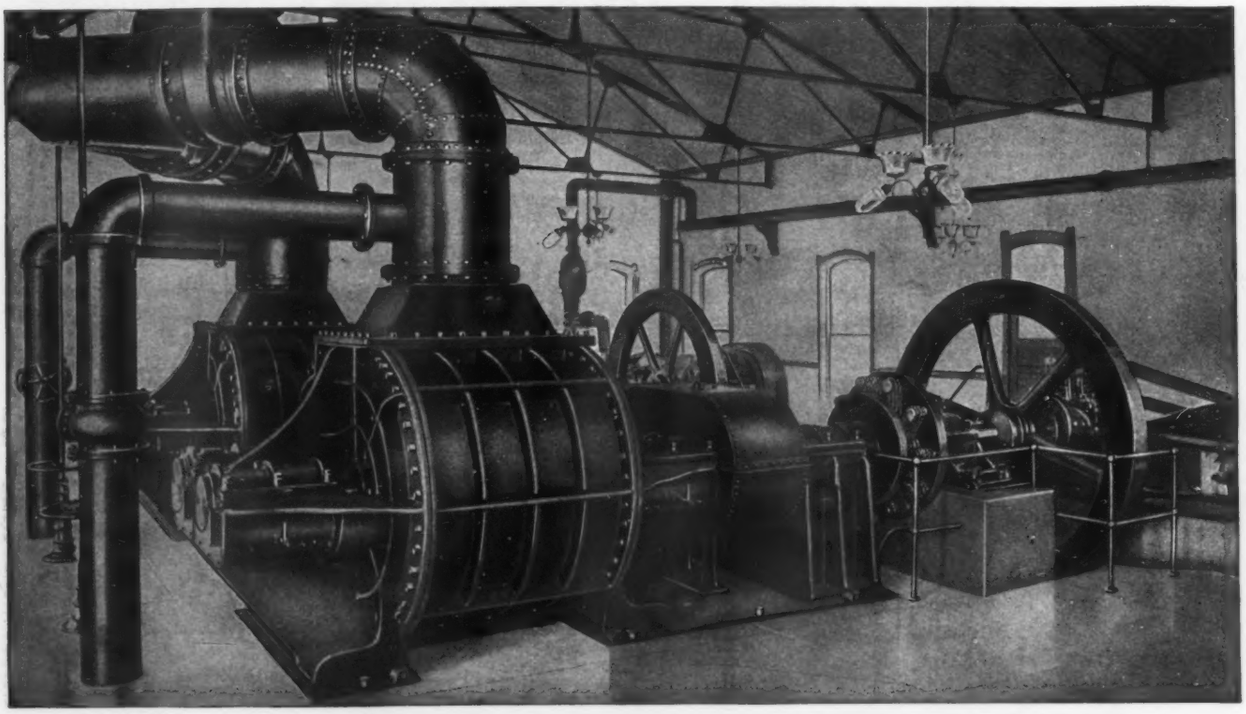
PRICE, $1.

FOR SALE BY

A. M. CALLENDER & CO., - 42 Pine St., New York.

ROOTS' EXHAUSTERS.

An installation of two units, each handling 800,000 cubic feet per hour, under 5 pounds per square inch, installed for the Peoples Gas Light and Coke Company, Chicago, Ills.



P. H. & F. M. ROOTS COMPANY,

HOME OFFICE: Connersville, Ind. NEW YORK OFFICE: 120-122 Liberty St. CHICAGO OFFICE: 1547 Marquette Bldg.

SEND FOR POCKET EDITION OF "ENGINEERS' PRACTICAL REFERENCE BOOK."

Mueller Extra Lamp Post Burner Cock.

The extra long bearing of the key with the body of Mueller Extra Lamp Post Burner Cocks gives the greatest security against leaking.

The most satisfactory illuminating results are obtained because of the extra length of the top, which throws the flame well up into the lamp. Made of red brass, rough only.

Unconditionally Guaranteed.

Round Way.

D-15903.

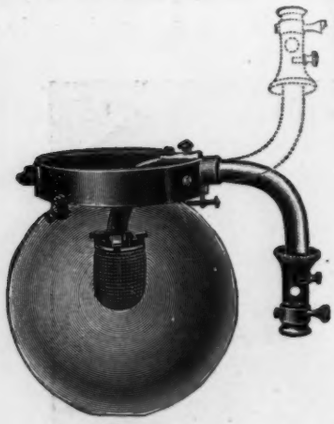
TRADE MARK
MUELLER
REGISTERED

H. MUELLER MFG. CO.

Works and General Offices,
DECATUR, ILL., U. S. A.
West Cerro Gordo St.

Chicago Branch, 37 Dearborn Street, Chicago, Ill., U. S. A.

Eastern Division,
NEW YORK, N. Y., U. S. A.
254 Canal St. (cor. Lafayette).



BRAY INVERTED BURNERS.

THEY ARE BETTER BECAUSE

They are Noiseless.
Operate under all pressures, 10-10ths to 60-10ths.
Can be used with By-Pass.
Won't carbonize when turned low.
Bray's Patent Expansion Shade Ring prevents breakage of glassware.
Won't flash back.
A sample will prove this.
Write us for prices.

W. M. CRANE COMPANY,

SOLE U. S. AND CANADIAN AGENTS.

ADDRESS, AFTER FEBRUARY 1:

16, 18 AND 20 WEST 32D STREET, NEW YORK.

GEORGE ORMROD, Pres. & Treas. JOHN D. ORMROD, Supt.
J. G. EBERLEIN, Secretary.

EMAUS PIPE FOUNDRY.

DONALDSON IRON COMPANY. EMAUS, PA.

MANUFACTURERS OF

CAST IRON PIPE AND SPECIAL CASTINGS

FOR WATER AND GAS.

Also, FLANGE PIPE, LAMP POSTS, Etc.

BRISTOL'S

REG. U. S. PAT. OFFICE.

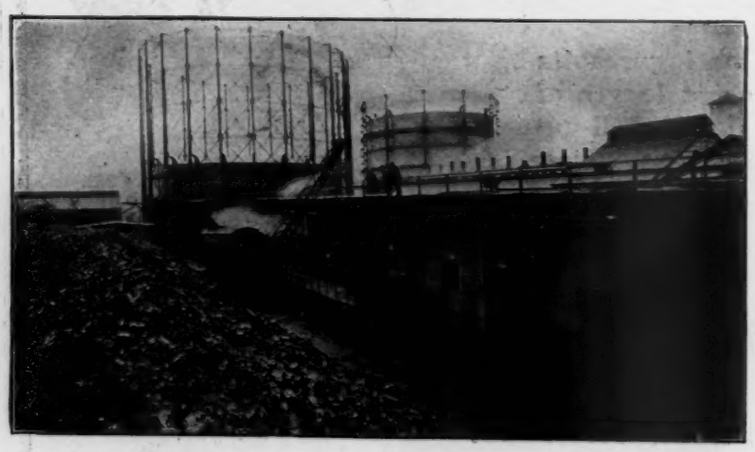
RECORDING GAUGES

FOR ALL RANGES OF PRESSURE AND VACUUM.

Write for New Bulletins.

THE BRISTOL CO., WATERBURY, CONN.

New York, BRANCH OFFICES. Chicago,



WRITE for our Catalogue "O" just issued. This Catalogue deals entirely with "Brownhoist" Machinery as used at Artificial Gas Plants for handling coal, coke and other materials rapidly and economically.

THE BROWN HOISTING MACHINERY COMPANY,

Designers and Builders of All Kinds of Hoisting Machinery.

Main Office and Works:
CLEVELAND, O.

Branch Offices:
NEW YORK AND PITTSBURG.

COAL TAR AND AMMONIA,

By GEORGE LUNGE, PH.D. Third and Enlarged Edition.
Price, $15. For Sale by
A. M. CALLENDER & CO., 42 Pine Street, New York City.

AMERICAN METER CO.,

NEW YORK, ST. LOUIS, PHILADELPHIA, SAN FRANCISCO, CHICAGO,

Photometrical and Experimental Apparatus.

PUBLIC LIGHTING TABLE.

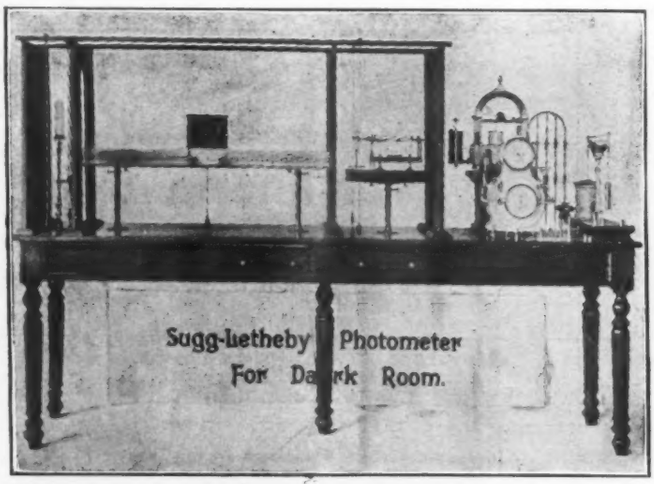
MARCH, 1909.

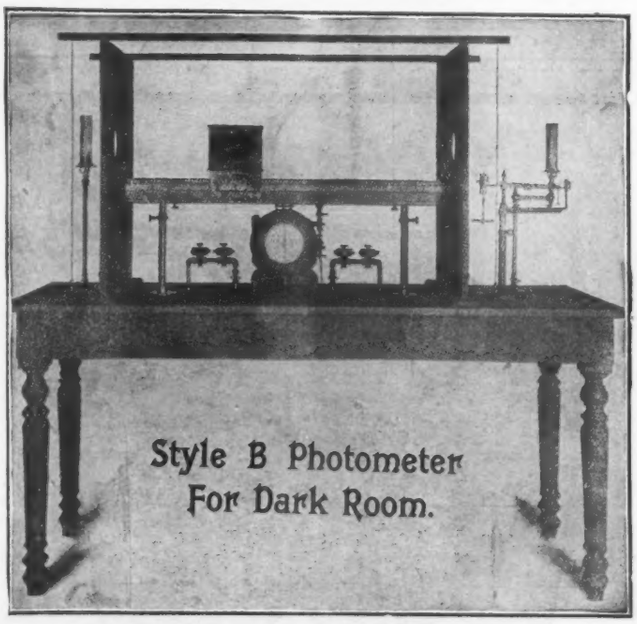
Day of Week.	Date.	Table No. 1. FOLLOWING THE MOON. Light.	Extinguish.
Mon.	1	3.10AM	5.30AM
Tue.	2	4.00	5.30
Wed.	3	4.40	5.30
Thu.	4	5.10	5.30
Fri.	5	No L.	No L.
Sat.	6	No L.FM	No L.
Sun.	7	No L.	No L.
Mon.	8	6.30PM	8.30PM
Tue.	9	6.30	9.30
Wed.	10	6.30	10.30
Thu.	11	6.30	11.30
Fri.	12	6.30	12.30AM
Sat.	13	6.30	1.30
Sun.	14	6.40LQ	2.40
Mon.	15	6.40	3.40
Tue.	16	6.40	4.30
Wed.	17	6.40	5.10
Thu.	18	6.40	5.10
Fri.	19	6.40	5.10
Sat.	20	6.40	5.10
Sun.	21	6.50NM	5.00
Mon.	22	6.50	5.00
Tue.	23	6.50	5.00
Wed.	24	6.50	5.00
Thu.	25	6.50	5.00
Fri.	26	11.10	5.00
Sat.	27	12.20AM	5.00
Sun.	28	1.10FQ	4.50
Mon.	29	2.00	4.50
Tue.	30	2.40	4.50
Wed.	31	3.10	4.50

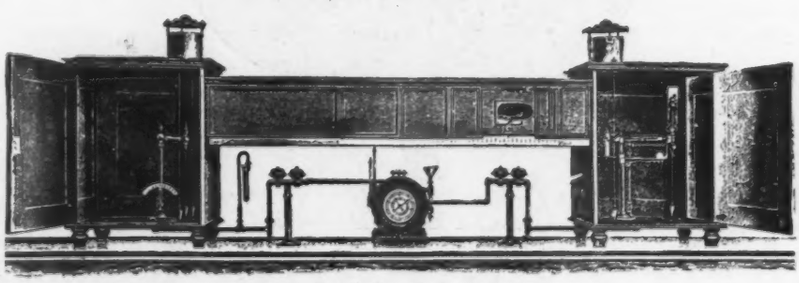
TOTAL HOURS DURING 1909.

By Table No. 1.

	Hrs.Min.
January	212.20
February	183.40
March	173.00
April	151.10
May	144.10
June	138.50
July	145.40
August	160.30
September	180.00
October	201.00
November	216.30
December	233.40
Total, yr.	2140.30







Closed Photometer For Light Room.

CIRCULARS SENT ON REQUEST.

PUBLIC LIGHTING TABLE.

MARCH, 1909.

Day of Week.	Date.	Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING. Complete Lighting in One Hour From Time Given P. M.	Complete Extinguishing in 50 Minutes From Time Given A. M.
Mon.	1	5.22	5.32
Tue.	2	5.22	5.27
Wed.	3	5.22	5.27
Thu.	4	5.22	5.27
Fri.	5	5.32	5.17
Sat.	6	5.32	5.17
Sun.	7	5.32	5.17
Mon.	8	5.32	5.17
Tue.	9	5.32	5.17
Wed.	10	5.32	5.17
Thu.	11	5.32	5.17
Fri.	12	5.42	5.07
Sat.	13	5.42	5.07
Sun.	14	5.42	5.07
Mon.	15	5.42	5.07
Tue.	16	5.42	5.07
Wed.	17	5.42	5.07
Thu.	18	5.42	5.07
Fri.	19	5.52	4.57
Sat.	20	5.52	4.57
Sun.	21	5.52	4.57
Mon.	22	5.52	4.57
Tue.	23	5.52	4.57
Wed.	24	5.52	4.57
Thu.	25	5.52	4.57
Fri.	26	5.57	4.47
Sat.	27	5.57	4.47
Sun.	28	5.57	4.47
Mon.	29	5.57	4.47
Tue.	30	5.57	4.47
Wed.	31	5.57	4.47

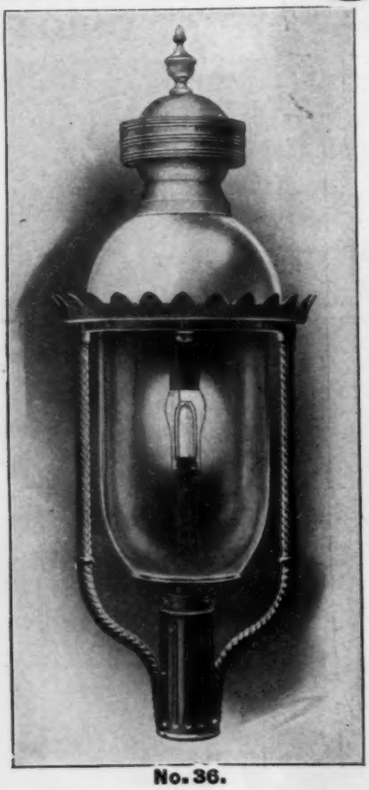
TOTAL HOURS DURING 1909.

	Hrs.Min.
January	428.30
February	358.15
March	353.10
April	298.10
May	263.20
June	234.45
July	248.30
August	278.00
September	311.25
October	370.05
November	397.40
December	438.35
	3980.25
Deduct on account of 50 min. extinguishing time	30.25
Total, yr.	3950.00

NEW YORK, 318 West 42d Street.
BOSTON, 820 Beacon Building.
PHILADELPHIA, Broad and Arch Streets.
ST. LOUIS, 712 Roe Building.
CHICAGO, 218 La Salle Street.
SAN FRANCISCO, 512 Oak Street.

WELSBACH STREET LIGHTING COMPANY

....OF AMERICA....



No. 36.

Controls and Operates the **Welsbach System of Street Lighting,**

Which includes its specially DESIGNED and PATENTED BURNER for PARK LIGHTING exclusively.

Uniformly SUCCESSFUL in 150 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

POINTS OF MERIT:

It is { Economical, Attractive, Successful, Up-to-date.

IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

Correspondence Solicited from Gas Companies and Others interested in Municipal and Outside Lighting.

No. 38.

Welsbach Junior

THE BIGGEST LITTLE LIGHT IN THE WORLD.

The Welsbach Junior Light is 5 inches high--consists of burner, mantle and chimney--and is attractively boxed in a pasteboard carton.

As its effectiveness and economy become better known the Welsbach Junior will supersede, for universal use in the home, the old-style open flame gas burners.

Gives 50-Candle Power.

Uses Two Feet of Gas per Hour.

Attaches to Any Gas Fixture.

Completely Hidden from View.

Use your own globe--either gas or electric.

Showing Welsbach Junior Light used in connection with ordinary glass globe.

SMALL—EFFICIENT—ECONOMICAL.

Welsbach Company, FACTORIES: Gloucester, N. J. Columbus, O.

Salesrooms in all Leading Cities of the United States.

The United Gas Improvement Company,

Broad and Arch Streets, Philadelphia.

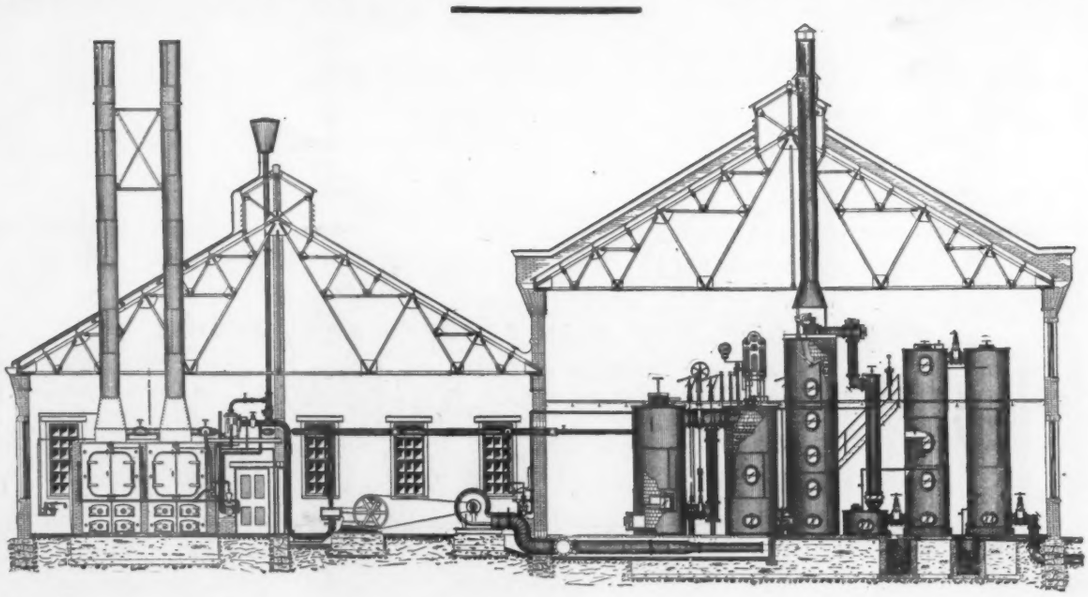
LESSEES, OPERATORS AND BUILDERS OF **GAS WORKS.**

Largest Builders of CARBURETTED WATER GAS PLANT IN AMERICA.

SOLE AMERICAN BUILDERS

OF THE

Standard Double-Superheater Lowe Water Gas Apparatus.



TOTAL SETS INSTALLED TO DECEMBER 31, 1908, ... 690
TOTAL DAILY CAPACITY, TO DECEMBER 31, 1908, ... 558,565,000 cu. ft.

Tar Extractors for Carburetted Water Gas.
Photometrical Apparatus.
Gas Analysis Apparatus.
Recording Gauges.
Straight Standpipe System for Coal Gas Retorts.
Straight Standpipe Cleaners.
Waste Heat Boiler.
Hygrometer.
Meters for Regulating Air and Steam Supply to Water Gas Apparatus.

Established 1868. Incorporated 1890.
CHAS. E. GREGORY, Prest. DAVID R. DALY, V.-Prest. & Treas.
H. D. ABERNETHY, Sec.

J. H. Gautier & Co.

Greene & Essex Streets,
Jersey City, N. J.

MANUFACTURERS OF

CLAY GAS RETORTS, FIRE CLAY TILES, FIRE BRICK and FIRE CLAY SPECIALTIES.

Ground Fire Clay, Fire Sand and Ground Fire Brick in Barrels and Bulk.

SOLE MANUFACTURERS OF THE

FLEMMING GENERATOR GAS FURNACE

KRATER-DINAS RETORT CEMENT.

Universally accepted to be the best cement for patching and repairing retorts, making up bench work, etc. Advantages: Powdered form; only mix with water; no waste; too much mixed, apply water and use the next time; adheres very easy; does *not* fall out by decarbonization. We guarantee or take back. Many re orders and recommendations from America, Germany, France, Belgium, etc. Write for price and testimonials.

STRASSBURGER BROS., Sole Importers,
563 Lincoln Avenue, Chicago, Ills.

GEROULD'S IMPROVED RETORT CEMENT.

A Cement of great value for patching retorts, putting on mouthpieces, making up all bench-work joints, lining blast furnaces and cupolas. This cement is mixed ready for use. Economic and thorough in its work. Fully warranted to stick.

Price List, f.o.b. NEW CASTLE, PA.

In Casks, 400 to 800 pounds, at 5 cents per pound.
In Kegs, 100 to 200 " " 6 " "
In Kegs less than 100 " " 7 " "

C. L. GEROULD,
29 North Mill St., New Castle, Pa.

"BEST BY TEST."

ESTABLISHED 1868.

L. N. RANCKE, V. Pres. & Mgr. E. L. RIEHA, Engineer.

BALTIMORE RETORT & FIREBRICK CO.

BALTIMORE, MD.

HIGH GRADE FIRECLAY MATERIAL FOR ALL PURPOSES.

DESIGNERS AND BUILDERS OF

BENCH CONSTRUCTIONS of the MOST DURABLE and EFFICIENT TYPE, WITH EITHER HORIZONTAL, INCLINED OR VERTICAL RETORTS.

SUPERIOR GRADE LININGS AND CHECKERBRICK FOR WATER GAS SETS.

WE SOLICIT YOUR INQUIRIES.

WALDO BROS., 102 Milk St., BOSTON, MASS.

AGENTS FOR NEW ENGLAND STATES.

LARGE MODERN FACILITIES.
RAIL AND WATER CONNECTIONS TO ALL POINTS.

EVENS & HOWARD FIRE BRICK CO. SAINT LOUIS

WE CAN NOW SHIP STAR RETORTS AND BENCHES FROM STOCK.

Write for Estimates on your Resetting Work. GAS WORKS DIVISION: A. S. B. LITTLE, Engineer.

JOHN DELL,
President and General Manager.

MISSOURI FIRE BRICK CO.,

ESTABLISHED 1882.

MANUFACTURERS OF

Gas Retorts, Bench Settings, Fire Brick, Cupola Linings, Etc.

We are the **Exclusive Agents** *for the* **Mitchell Patent Benches,** *Constructed with Half or Full Depth Furnaces, to Burn either Coal or Coke, and Arranged for Front or* **Rear Clinkering.** **The Mitchell** *is the* **Original Coal Firing Bench.** *We also Erect Plain Benches with* **One** *to* **Six Retorts.**

YOUR CORRESPONDENCE IS RESPECTFULLY SOLICITED.

City Office: *411 Olive Street, Continental Bank,* ST. LOUIS, MO.

EXPERT INSPECTION of Holders and Other Structures During Construction.
ECONOMIC DESIGN of Steel Structures, Reinforced Concrete, Masonry and Foundations.
CHAMBERS & HONE, Consulting Engineers, ... 15 William Street, New York City.

Bronder Patent Stoking Machinery.

Three-Scoop and Three-Rake Charging and Discharging Machines are operating in New York, Newark, N. J., Philadelphia, Worcester, Mass., Mt. Vernon, N. Y., Toronto and Montreal, Canada, Detroit, Seattle, Rochester and St. Louis.

Four-Scoop and Four-Rake Charging and Discharging Machines are operating in Detroit, Mich., and Cincinnati, Ohio. These are the only machines that will draw or charge simultaneously 3 or 4 retorts (vertically) and handle from 42 to 60 retorts in from 25 to 30 minutes, lid opening and closing and filling of furnaces included.

Hot **Coke Conveyor, Quencher and Steam Exhauster,** operating in Toronto, Canada, working in water-sealed flue, rollers being protected from heat and grit.

COAL CRUSHERS, CONVEYORS AND BINS. TURNTABLES FOR MACHINES.

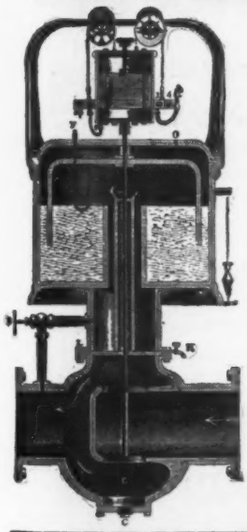
Labor-Saving Machines for Handling Coal and Coke from Coal Cars to Coke Yard or Bins. Coke Screening and Measuring Plants a Specialty.

G. A. BRONDER,

Contracting Engineer and Builder,

229 BROADWAY, NEW YORK.

CONNELLY IRON SPONGE AND GOVERNOR CO.,



Automatic, Balance, High Pressure and Service Governors,

Unison Telemetric Pressure Gauge,

Iron Sponge, Purifying Material for Gas Purification, Manufacturers of Jones Jet Photometers, The National Smoke and Ammonia Helmet, Sulphur Testers, High and Low Pressure House Governors.

Wide Experience in High Pressure Installation and Extension.

50 CHURCH STREET, NEW YORK CITY.
295 WEST 22D STREET, CHICAGO, ILLS.

12-Inch High Pressure Governor.

REYNOLDS' GAS REGULATOR COMPANY,

ANDERSON, IND., U. S. A.

We make all sizes for all classes of reduction,

Double and Single District Stations,

And Individual Service Governors for Reducing High Pressure.

HOLDER GOVERNORS

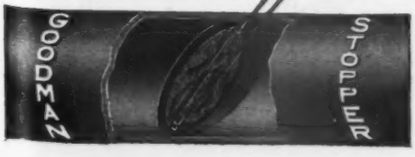
And Low Pressure Regulators, all of the Dry Diaphragm type.

English Agents:
THE BRYAN DONKIN CO., LTD., Chesterfield, England.

Write for Catalog.

Combination Governor.
(Governor and Mercury Seal.)

AWARDED A SILVER MEDAL AT THE WORLD'S FAIR, ST. LOUIS, 1904.



SAFETY GAS MAIN STOPPER CO.,

257-263 East 133d Street,
NEW YORK CITY.

PATENTS, TRADE MARKS, COPYRIGHTS.

ROYAL E. BURNHAM,

Solicitor of Patents and Counsellor in Patent Causes.

833 Bond Building, Washington, D. C.

Send for Pamphlet on Patents.

JAMES D. PERKINS, President. F. SEAVERNS, Treasurer.

THE PERKINS COMPANY,

228 and 229 Produce Exchange, New York City.

OCEAN MINE YOUGHIOGHENY GAS COAL,
OLD KENTUCKY SHALE AND O. K. BOGHEAD.

BERWIND-WHITE COAL MINING COMPANY'S

Ocean Westmoreland Gas Coal.

Offices:
Washington Building, New York.
Betz Building, Philadelphia.

STRICTLY High Grade. . . . .
Carefully Prepared.
For Gas Making or
Heavy Steaming.

A. C. M. AZOY, General Agent, 1 Broadway, New York.

ISAAC C. BAXTER, President. ESTABLISHED 1864. PETER YOUNG, Secretary and Treasurer.

Works.
LOCKPORT STATION, PA.

JAMES GARDNER, JR., CO.,

Successor to WILLIAM GARDNER & SON.

Address all communications to
JAMES GARDNER, JR., CO., Bolivar, Pa.

Fire Clay Goods for Gas Works.

WESTERN OXIDE AND SPECIALTY CO.,

IRON OXIDE FOR GAS PURIFICATION.

We manufacture "Western Oxide," which is a gas purifier made of fine cast iron borings. It is the best and cheapest gas purifier manufactured. It is perfectly cured and ready for immediate use. No gas company can afford to be without it, no matter what they use for gas purification. Send us the amount of your requirements and we will be pleased to submit to you our best prices and sample.

WESTERN OXIDE AND SPECIALTY CO.,
21ST AND JEFFERSON STREETS, CHICAGO, ILLS.

1908 DIRECTORY 1908

OF AMERICAN GAS COMPANIES.

Price, - - - - - - - - - $5.00.

FOR SALE BY

A. M. CALLENDER & CO., 42 Pine Street, New York City.

KELLER ADJUSTABLE COKE CRUSHER.

Strong, Simple, Durable. Will Crush any Size Desired.

C. M. KELLER,

Columbus, Ind.

Correspondence Solicited.

THE ECONOMICAL GAS APPARATUS CONSTRUCTION COMPANY, LIMITED,

Consulting Engineers.

Builders of UP-TO-DATE Machinery and Appliances for Coal and Water Gas Plants. :: :: :: :: ::

PLANS, SPECIFICATIONS AND ESTIMATES PREPARED.

AMERICAN OFFICE:

269 Front St., East, Toronto, Canada.

JOHN CABOT, President. GEO. D. CABOT, Secretary.

1412-1428 Adams Street, Hoboken, N. J.

PURIFIER AND SCRUBBER TRAYS.

Church's Patent Trays,

Reversible; Strongest; Most Easily Repaired.

We also Supply the Cheapest and Strongest

Reversible Bolted Trays.

Special Trays for Iron Oxide in Either Style.

EDMUND H. McCULLOUGH, President. H. C. ADAMS, Vice-President. CHAS. F. GODSHALL, Treasurer. HENRY WHARTON, Secretary. C. B. NICHOLS, Assistant Secretary.

THE WESTMORELAND COAL CO.

Chartered 1854.

Mines situated on the Pennsylvania and the Baltimore and Ohio Railroads, in Westmoreland County, Pa.

POINTS OF SHIPMENT:

PHILADELPHIA, BALTIMORE, SOUTH AMBOY, N. J., WATKINS (SENECA LAKE), N. Y.

Since the commencement of operations by this Company its well-known Coal has been largely used by the Gas Companies of New England and the Middle States, and its character is established as having no superior in gas-giving qualities, and in freedom from sulphur and other impurities.

Principal Office, 224 South 3d St., Phila., Pa.

GAS MAINS—SERVICE PIPES.

Their installation for High or Low Pressure is the work in which we have specialized for years. Because of our Facilities and Experience, many Gas Companies prefer to contract with us for such work, rather than to execute it themselves. It proves to be as cheap in the end. We solicit inquiries.

Telephone Connection.

SULLIVAN BROS.,
11 Main St., Flushing, N. Y.

GAS TAPPING MACHINES

—FOR—

Drilling and Tapping Pipe under Pressure

WITHOUT ANY ESCAPE OF GAS.

They are Strong and Compact.

Size of Combination Drills and Taps ¾ to 4-inch.

Machines Sent to any Gas Company for Thirty Days' Trial.

Send for Circulars.

Geo. Light,
DAYTON, O.

"THE MINER"

Globe Street and Boulevard Lamps.

Cheapest and Best

THOUSANDS IN USE WITH INCANDESCENT BURNERS.

Send for Catalogues.

THOMAS T. W. MINER,

821-823 Eagle Av., N. Y.

Gas Engineer's Pocket-book, —BY— HENRY O'CONNOR,

Comprising Tables, Notes and Memoranda relating to the Manufacture, Distribution and Use of Coal Gas, and the Construction of Gas Works. PRICE, $3.50. For Sale by

A. M. Callender & Co., 42 Pine St., New York City.

AMERICAN GAS ENGINEERING PRACTICE,

A HANDBOOK FOR ALL ENGAGED IN THE INDUSTRY,

Comprising Many Details Not Heretofore Published,

By M. NISBET LATTA, C.E.,

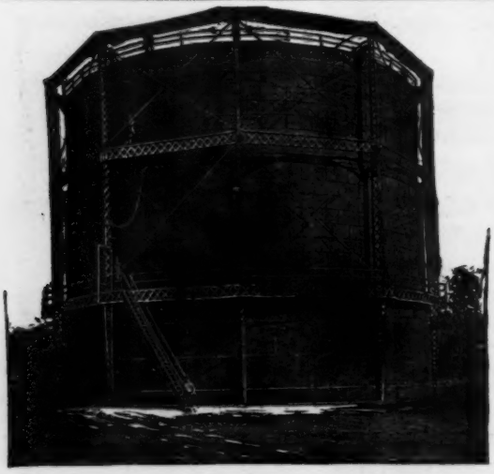
PART I. WATER GAS MANUFACTURE. The Generator. The Carburetter. The Superheater. Wash Box and Tar. Scrubbers. Condensers. Purifiers. Exhausters. Station Meters. Holders. Details of Works' Operation.

" II. GAS DISTRIBUTION. Naphthaline. Mains. Services. Consumers' Meters. Pressure. House Piping. Appliances.

" III. GENERAL TECHNICAL DATA. Properties of Gases. Steam. Mathematical Tables. Conversion Factors. Pipe and Miscellaneous Data.

Price, $4.50. For Sale by

A. M. CALLENDER & CO., 42 PINE ST., NEW YORK CITY.



DAVIS & FARNUM MFG. CO.,
Principal Office and Works, Waltham, Mass.

Single, Double and Triple-Lift Gasholders of any Capacity. Tubular, Pipe and Sinuous Friction Condensers of all Sizes.

Steel Tanks for Gasholders, Iron Roof Frames and Floors, Purifying Boxes, Center Seal or Valve Connections, Bench Work, Reversible Lime Trays.

Self-Sealing and Pressed Steel Mouthpiece Lids.

Coke Barrows, Coal Wagons, and all Apparatus Requisite for a Complete Gas Works.

Also, Gas and Water Pipe, Flanged Pipe, Sugar House Work, and Special Castings of all Descriptions.

H. M. BYLLESBY & COMPANY
(INCORPORATED),

GAS ENGINEERS,

DESIGN, CONSTRUCT AND OPERATE
COMPLETE COAL, WATER AND CRUDE OIL GAS PLANTS.

EXAMINATIONS AND REPORTS.

AMERICAN TRUST BUILDING
CHICAGO.

Oklahoma City, Okla. Mobile, Ala. San Diego, Cal.

ALEX. C. HUMPHREYS, M.E., M. Inst. C.E. ARTHUR G. GLASGOW, M.E., M. Inst. C.E.

HUMPHREYS & GLASGOW,
CONSULTING ENGINEERS.

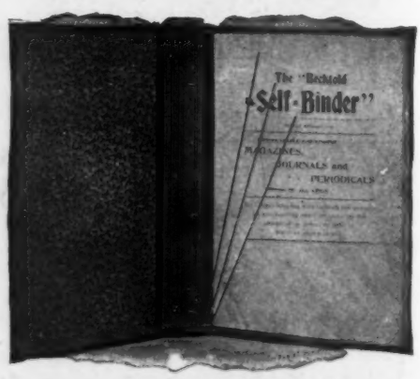
CITY INVESTING BUILDING.
165 Broadway
New York.

38 VICTORIA STREET,
London, S. W.,
England.

ADVICE AS TO EXTENSION AND RECONSTRUCTION OF GAS AND ELECTRICITY PLANT.

COMPLETE EXAMINATIONS MADE.
PROPERTIES PURCHASED.

BINDER for the JOURNAL.



Price, $1.00.

A. M. CALLENDER & CO., 42 Pine Street, N. Y.

HUNT CABLE RAILWAYS
For Handling Coal and Coke in Gas Works.

The cost of handling coal and coke by this method is only the expense of loading the cars (one man) and the power to drive the cable. Every inch of ground is available, as the space under the trestles can be utilized for storage, if necessary. These railways are built of different types, to handle any quantity of material, large or small.

If you are interested in the subject, we will take pleasure in sending you photographs of some of the plants we have installed upon receipt of your card, and will give such information as is in our power if you will let us know your requirements.

C. W. HUNT CO., West New Brighton, N. Y. 45 Broadway, New York.

Alcohol, its Manufacture from Farm Products and De-Naturing. By F. B. WRIGHT.

Price, $1. *For Sale by*
A. M. Callender & Co., 42 Pine St., New York City.

FIELD'S ANALYSIS FOR THE YEAR 1907.

An Analysis of the Principal Gas Undertakings in England, Scotland and Ireland; being the 30th year of publication. Compiled and arranged by JOHN W. FIELD, Sec'y and Gen. Mgr. of The Gas Light and Coke Company, London. Price, $5. For Sale by
A. M. CALLENDER & CO., 42 Pine St., New York City.

Bartlett, Hayward & Company,

Baltimore, Md. 100 Broadway, New York.

GASHOLDERS,

Coal and Water Gas Plants.

KERR MURRAY MANUFACTURING COMPANY,

Engineers and Manufacturers

APPARATUS FOR COAL GAS PLANTS,

SINGLE AND DOUBLE-LIFT GASHOLDERS
AND STEEL TANKS,

Latest Improved

ROTARY EXHAUSTERS, P. & A. TAR EXTRACTORS, AMMONIA WASHERS,

CONDENSING, SCRUBBING AND PURIFYING APPARATUS.

Street Specials and Valves.

ADDRESS:

KERR MURRAY MANUFACTURING COMPANY, FORT WAYNE, IND.

R. D. WOOD & CO.,

400 CHESTNUT ST., PHILADELPHIA,

MANUFACTURERS OF

Cast Iron Pipe.

HEAVY LOAM CASTINGS,

Dunham Specials,

Hydraulic Work,

LAMP POSTS, VALVES, ETC.,

Gas Power Plants with Producers.

BUILDERS OF

Gasholders.

Single or Multiple Lifts, with or without Metal Tanks.

PURIFIERS, CONDENSERS, SCRUBBERS, BENCH WORK.

Cutler's Patent Freezing Preventer for Holder Cups.

Double Gate Valves.

A LARGE STOCK ON HAND READY FOR PROMPT SHIPMENT.

These valves are provided with double discs or gates, and are tight with the gas pressure on either side of them.

The discs are so arranged as to be free from their seats when being opened or closed, and are operated by a quick-acting mechanism. The valve stem extends outside of the bonnet, and serves as an index, showing whether the valve is closed or open, and the amount of opening. They are made of the following dimensions:

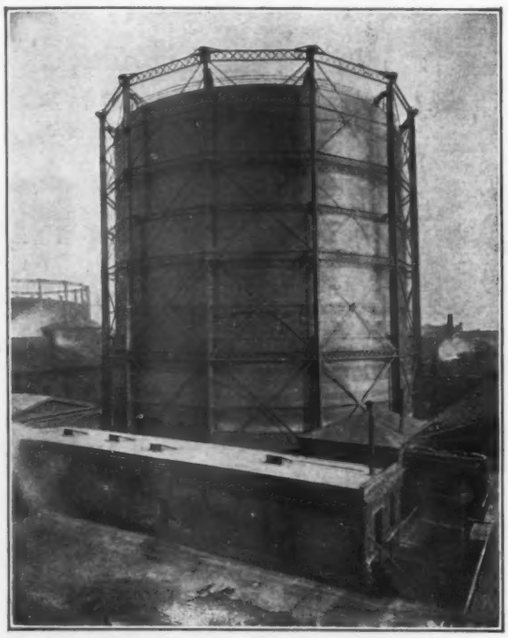
Size.....	8 inches	10 inches	12 inches	16 inches	20 inches	24 inches	30 inches	36 inches
Diameter of flanges....	13 inches	16 inches	18 inches	22½ inches	27 inches	31 inches	31½ inches	44 inches
Face to face of flange...	12 inches	12 inches	12 inches	14 inches	17 inches	20 inches	21 inches	23¾ inches

For price and other information, apply to

THE CONTINENTAL IRON WORKS,

P. O. STATION G. NEW YORK (BOROUGH OF BROOKLYN).

WATCH THIS SPACE.



Established 1851. Incorporated 1880.

THE STACEY MFG. CO.,

Gas Engineers and Builders.

Gas Holders

Roofs, Condensers, Washers, Purifiers, Valves, Cast Connections, Street Specials, Oil and Water Tanks, Stand Pipes, Etc.

General Offices and Works:
Elmwood Place Station, CINCINNATI.

WESTERN OFFICE: 718 Mission Street, San Francisco, Cal.

CORRESPONDENCE SOLICITED.

GAS BENCHES,

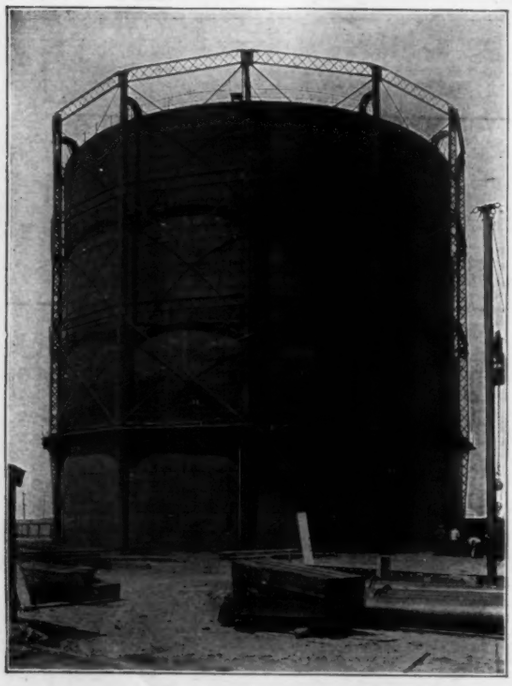
RETORTS AND FIRE BRICK.

LATEST DESIGNS,
HIGHEST GRADE MATERIAL,
SUPERIOR WORKMANSHIP,
UNEQUALED RESULTS.

DESIGNS AND SPECIFICATIONS FURNISHED ON THE HORIZONTAL, INCLINED OR VERTICAL RETORT SYSTEMS FOR COMPLETE GAS WORKS.

LACLEDE-CHRISTY CLAY PRODUCTS CO.,

ST. LOUIS, MO.



JOHN FOWLER, President. J. SCOTT FOWLER, Vice-Pres. & Treas.

DEILY & FOWLER MFG. CO.,

39 Laurel Street, Philadelphia, Pa.

ESTABLISHED 1842. INCORPORATED, 1908.

BUILDERS OF

GASHOLDERS,

Single-Lift or Telescopic,

With or Without Steel Tanks.

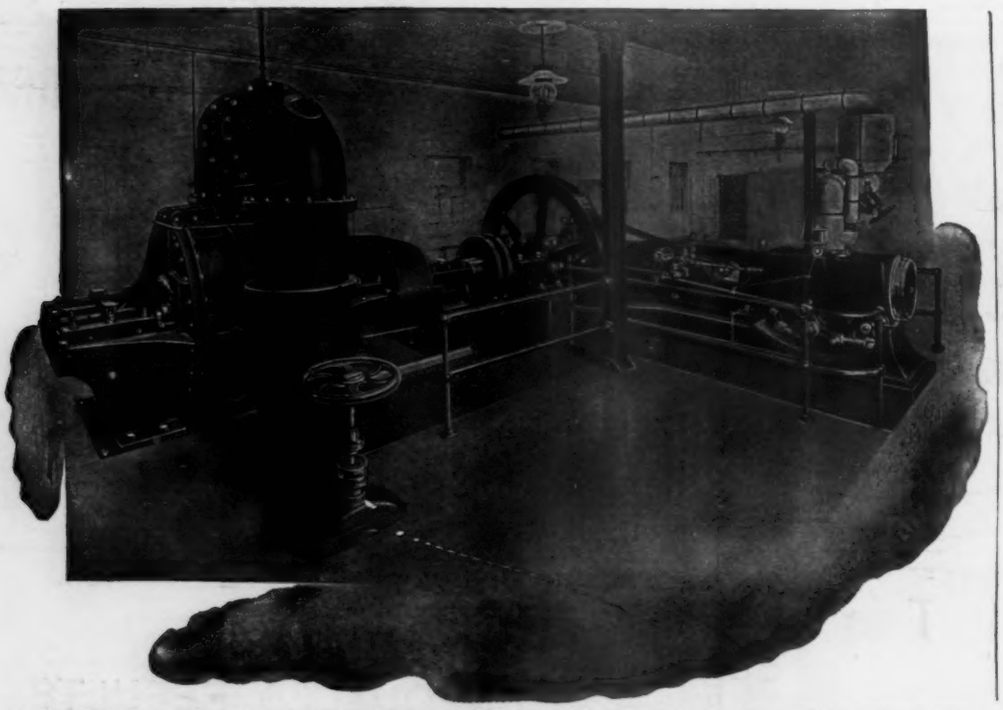
Oil Storage Tanks, Water Tanks, Etc.

ESTIMATES CHEERFULLY FURNISHED.

CORRESPONDENCE SOLICITED.

CONNERSVILLE GAS EXHAUSTERS

AND HIGH PRESSURE GAS PUMPS.



THIS cut shows one of our High Pressure machines and a 4-valve engine connected by one of our leather link flexible couplings. Two of these units were installed for the Peoples Gas Light and Coke Co., Chicago, at their 73d St. Station. Each machine has a capacity of 14,000,000 cubic feet per day.

—o—

We also manufacture

GAS VALVES,
BY-PASS VALVES,
PRESSURE REGULATORS,
ETC., ETC.

Correspondence Solicited.

THE CONNERSVILLE BLOWER COMPANY,

Connersville, Indiana, U. S. A.

NEW YORK OFFICE, 50 Church Street. • • HORACE C. COOKE, Selling Agent.

FREDERIC EGNER,
Gas Engineer,
NORFOLK, VA.,

May be consulted with reference to estimates of cost for new, or appraising actual value of existing works; utility of proposed or patented processes; relative earning power to capitalization, and management.

GAS ANALYST'S MANUAL,

By JAQUES ABADY, M. Inst. Mech. E.

Incorporating F. W. Hartley's "Gas Analyst's Manual" and "Gas Measurement."

Ninety-three Illustrations and Nine Folding Plates. Bound in Handsome Half Leather. Price, $6.50.

For Sale by **A. M. CALLENDER & Co., 42 Pine St., New York City.**

D. McDONALD & CO.,

971-997 BROADWAY, ALBANY, N. Y.,

MANUFACTURERS OF

DRY GAS METERS, STATION METERS, PREPAYMENT METERS, METER PROVERS AND GAUGES.

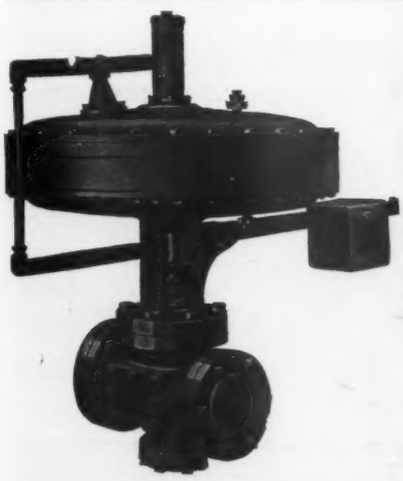
THE GLOVER PREPAYMENT METER,

Simple, Strong, Satisfactory.

THE HINMAN STATION METER DRUM,

The greatest advance that has been made in 20 years in the ACCURATE and ECONOMICAL measurement of gas in large quantities. :: :: ::

NEW YORK OFFICE: 561 West 47th Street. | ALBANY OFFICE: 991 Broadway. | CHICAGO OFFICE: Jefferson and Monroe Streets.



THE FULTON GAS PRESSURE GOVERNORS

For Artificial or Natural Gas.
For District or Individual Service.

Our Improved **Duplex Sensitive Governor** for district service will reduce high pressure gas to inches of water without variation. Absolutely safe and reliable. No complicated mechanism to get out of order. No auxiliary regulators or other devices to assist the main governor required. The most simple and perfect governor ever placed on the market. We also manufacture Holder Governors, Compressor Governors and Individual Service Governors for any inlet and outlet pressure.

More than 20 years' experience with the largest gas companies. Send for Catalog.

THE CHAPLIN-FULTON MFG. CO.,
28-34 PENN AVE., PITTSBURGH, PA.

The Sprague Meter Co.

Manufacturers of

Cast Iron Gas Meters

for

Artificial or Natural Gas

Plain or Prepayment

Lower in first cost and cheaper to maintain than any meter on the market.

Write us for particulars.

The Sprague Meter Company

203 Water St., Bridgeport, Conn.

NATHANIEL TUFTS METER COMPANY,

455 Commercial St., Boston, Mass.

PREPAYMENT GAS METERS,
WET AND DRY GAS METERS, STATION METERS, ETC.

REPAIRING OF ALL MAKES OF METERS, AND FITTED WITH OUR PREPAYMENT ATTACHMENT.

B

METERS.

INCREASED CAPACITY.
INCREASED EFFICIENCY.

PREPAYMENT METERS, STATION METERS, METER PROVERS, ETC.

PROMPT AND CAREFUL ATTENTION TO ALL REPAIR WORK.

MARYLAND METER COMPANY,
BALTIMORE.—CHICAGO.

YOU NEED ONE OR MORE OF OUR COMPLAINT METERS.

METERS, Plain and Prepayment,

For Artificial or Natural Gas.

Repairing All Makes and Attachments Added if Desired.

SPECIAL METERS FOR ACETYLENE.

KEYSTONE METER COMPANY,
ROYERSFORD, PA.

JUDICIOUS ECONOMY IS EFFECTED

BY USING

5-L. IMPROVED GAS METERS.

LOW SPEED, LARGE DIAPHRAGMS, STRONGER CONSTRUCTION, LARGER CAPACITY.

FITTED WITH

THE NEW YORK PREPAYMENT ATTACHMENT.
STEEL BOX AND CABINET LOCK.

NEW YORK IMPROVED METER CO., 306-310 East 47th St., New York City.

PACIFIC COAST REPRESENTATIVE: THE NORTHWEST GAS EQUIPMENT CO., Portland, Ore.

AMERICAN METER CO.,

NEW YORK, ST. LOUIS, PHILADELPHIA, SAN FRANCISCO, CHICAGO,

Wet and Dry Gas Meters, Station Meters, Meter Provers,
Photometrical Apparatus, Gauges,

PREPAYMENT METERS,

REGULAR METERS REFITTED WITH PREPAYMENT ATTACHMENTS.

HELME & McILHENNY,

Established 1848. **1339 to 1349 Cherry Street, Philadelphia, Pa.**

MANUFACTURERS OF

Wet and Dry Gas Meters, Station Meters, Provers, Gauges, Etc.

METERS REPAIRED

PREPAYMENT GAS METERS.

Our Own Patents. Strong. Simple. PROMPT ATTENTION. CORRESPONDENCE SOLICITED.

INLET AT TOP.

PATENTED MAY 13, 1902.

STANDARD AND SELF-DRAINING GAS METERS.

PLAIN OR PREPAYMENT FOR ARTIFICIAL OR NATURAL GAS.

LARGE CAPACITY.
LOW SPEED.
STRONG CONSTRUCTION.

REPAIRING OF ALL MAKES OF METERS.

UNITED STATES METER COMPANY,

229 to 269 Chestnut Street, Brooklyn, N. Y.

INLET AT BOTTOM.

PATENTED MAY 13, 1902.

METRIC METAL COMPANY,

MAKERS OF

GAS METERS for NATURAL and ARTIFICIAL GAS.

Special Attention given to Repairing METERS of all Makes.

FACTORY AT ERIE, PA.

JOHN J. GRIFFIN & CO.,

1513 TO 1521 RACE STREET,
PHILADELPHIA.

559 West 47th Street,
NEW YORK.

Jefferson and Monroe Street
CHICAGO.

GAS METERS,

Station Meters and Apparatus of Every Description.

REPAIRING CAREFULLY DONE.

THE POSITIVE PREPAYMENT METER.

OVER 600,000 OF THESE PREPAYMENT METERS ARE IN USE IN THE UNITED STATES, AND THE DEMAND IS STEADILY INCREASING.

If you have some ordinary meters to be repaired, send them to us and let us repair and convert them into prepayment meters. They will be a source of satisfaction and profit to you.

SEND FOR OUR CATALOGUE AND OUR PREPAYMENT BOOKLET.